aCampus
Awareness Campaign for Better Use of Standards

співпраця з німеччиною
DEUTSCHE ZUSAMMENARBEIT

Виконавець:
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

tk185.appau.org.ua


# INCREASING AWARENESS AND BETTER USE OF INTERNATIONAL TECHNICAL STANDARDS

## IN INDUSTRIAL AUTOMATION IN UKRAINE

## FINAL REPORT BY THE RESULTS ACAMPUS PROJECT

| TC | 185 |
| --- | --- |
| INDUSTRIAL AUTOMATION | |


QUALITY

# INCREASING AWARENESS AND BETTER USE OF INTERNATIONAL TECHNICAL STANDARDS

## IN INDUSTRIAL AUTOMATION IN UKRAINE

## FINAL REPORT BY THE RESULTS ACAMPUS PROJECT

| TC | 185 |
| --- | --- |
| INDUSTRIAL AUTOMATION | |

# CONTENTS



співпраця з німеччиною
DEUTSCHE ZUSAMMENARBEIT

Виконавець:
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH


The document was prepared within the framework of the project «Promotion of a Supportive Framework for Trade in Ukraine», which is implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and funded by the German government. The content of the publications is the sole responsibility of their authors and cannot be seen as such, reflecting the views Deutsche Gesellschaft für internationale Zusammenarbeit (GIZ) GmbH.

# Overview of aCampus Project

Technical Committee 185 «Industrial Automation» (TC 185) together with the Association of Industrial Automation of Ukraine (APPAU) present in this analytical report the results of the aCampus project. aCampus is the campaign on increasing the awareness and the use of 5 international technical standards ISO/IEC by industrial enterprises in Ukraine. The project was implemented with the help of German Society for International Cooperation GIZ and it is one of the sphere of improvement in the sphere of technical regulation of Ukraine.

**It is difficult to overestimate the importance and results of the project in terms of the numerous challenges it has addressed. Their list is really large:**

- Ignoring by the majority of Ukrainian industrial enterprises of international safety standards or process management, – and in the context of the State approach to be closer to EU.
- New challenges to cyber-security and weak institutional capacity of state institutions in this area.
- Populisme and hype around Industry 4.0 – and the low level of un-

derstanding among developers that cyber-physical interaction requires common standards, hence the ignoring of these standards.

- The gap between university programs and best practices that embody standards, and the low integration of universities into the market environment.
- Lack of mass, educational content in the sphere of standards - and even more so in Ukrainian language.

- ...
- ...are just some of the long list of standardization issues.

The project team of 12 specialists – TC 185 experts – worked for 6 months to significantly improve the situation on the market and in relation to these challenges.

The team brought at the level of DSTU (local norms) 5 international standards IEC / ISO, translated them into Ukrainian, established a regular flow of educational content (dozens of white books, guides, articles, etc.), streamlined all content on a single web resource TC 185 and established regular communication with the market .

As a result of these works, the project involved almost 500 specialists, from more than 130 organizations, the vast majority of which are industrial enterprises. According to the final survey of the project, almost 50% of them are now actively familiar with the project, and another 20% are considering including standards in their technical policies.

Despite its obvious successes and achievements, the project has also discovered and shown some important common issues. The involvement of enterprises is not a matter of education or market education alone. The issue is deeper and it concerns of the role of technical directorates in enterprises, and of the existence of technical policies of good quality and really with strategic orientation. The lack of such policies on a large scale and at the level of enterprise management has determined the low priority of technical standards, and also the lack of willingness on the part of customers to fund such work. The report also identifies other areas of concern that are being addressed by the expert community and the country's Technical Committees.

But the project has also demonstrated the strength and ability of communities to come together to address such issues. Among the particularly positive results, I would like to mention the proven ability of technical universities to generate a flow of educational, quality content, attracting and contributing to the project first-class specialists from the client, as well as consultants, and reaching out to process models in the development of standards and knowledge management.

We are sincerely thankful to all involved partners of the project and our esteemed donor, the German Society for International Cooperation GIZ, for this wonderful project, which really was a turning point for both TC 185 and the whole APPAU community.

Head of Technical Committee 185
«Industrial Automation»
Yurchak Alexandre

# About aCampus project

The aCampus project (Awareness CAMPaign for better use of Standards) is an information and analytical campaign to increase awareness and better use of international standards in industrial automation and IT by Ukrainian customers and developers. The project lasted from August 2019 to March 2020 and was launched by the Technical Committee 185 «Industrial Automation» and the Association of Industrial Automation Enterprises of Ukraine (APPAU) with the support of the German community of international cooperation GIZ.

# THE PROJECT HAD 3 MAIN OBJECTIVES

## 01 Raise 5 IEC/ISO standards to DSTU level

- IEC 62443 – Standard for Cyber Security in Automation Control Systems.
- IEC 51608 – Functional Safety in Industrial Control Systems.
- IEC 61512 – batch production management.
- IEC 62264 – Manufacturing Execution System Integration.
- ISO 22400 – Manufacturing Key Performance Indicators Management.

## 02 Develop an advertising – educational toolkit (package of documents)

- Translation of the relevant standard in Ukrainian.
- 1 white paper for each standard (5 total).
- Creating a short version of the standard (guide).
- Promotion content package (articles, blogs) – for raising awareness.

## 03 Raise the level of awareness of the target audience

Raise the level of awareness of the target audience by actively promoting this promotional package for 4 categories of users – industrial enterprises, universities, system integrators and software developers. These activities included a large number of various offline and online events during the 4 months.

# INTERNATIONAL STANDARDS THAT HAVE BEEN CONSIDERED AS PART OF THE PROJECT

At the beginning of the project implementation 5 standards were almost unknown and were not used in Ukraine. They have no analogues of the former post-Soviet GOSTs. Meanwhile, these standards are the basis for industrial production – both for end customers and for integrators and developers.

All standards are under the authority of the Technical Committee 185 (TC 185) «Industrial Automation» and were included in the Program of work on national standardization for 2019.

| | Title | Area of influence | What is this standard about and why is it important |
|---|---|---|---|
| 1. | **ISO 22400** | **Operational efficiency of enterprises – system of production Key Performance Indicators (KPI)** | Profit of the enterprises directly depends on efficiency of production processes. Despite this uppercase truth, the state of KPIs at Ukrainian production facilities is unknown. According to APPAU surveys, the majority of industrialists are not sufficiently aware of and do not use such indicators as OEE (Overall Equipment Effectiveness), which directly affects profits. Insufficient use of production KPIs leads to ignoring the control system and IT – after all, it is they who most affect the improvement of production KPIs and their measurement in automatic mode. In total, ISO 22400 regulates 34 manufacturing KPIs. |
| 2. | **IEC 62443** | **Cyber-security in control system** | Since 2014, Ukraine has been at the epicenter of cyber attacks. The use of this standard will significantly reduce vulnerability to cyberattacks and improve information security at the level of industrial, energy, transport and infrastructure enterprises. |
| 3. | **IEC 61508** | **Functional safety in control systems** | Ukraine has not yet implemented functional safety standards that are responsible for the level of technogenic risks in industries with potentially high levels of danger to human life and the environment. This standard is the basis for ensuring an adequate level of safety at various industrial, energy, infrastructure and oil and gas production facilities. |
| 4. | **IEC 62264** | **Enterprise-control system integration** | At 90% of enterprises in Ukraine there are significant gaps between the levels of control systems and ERP. The link that connects these levels is a real-time production management system – MES (MOM). By the level of their implementation Ukraine lags far behind the developed countries of the world. Standard IEC 62264 is a basis of these systems, and allows to regulate and unify information models for information flows at various production levels. |
| 5. | **IEC 61512** | **Automation in batch processes** | This standard – although designed for a lot of recipe manufacturing – is the basis for all types of control systems and helps to improve the efficiency of production process management. Its use allows for flexible changeover of the production recipe without reprogramming the lower-level controllers of the control system. |

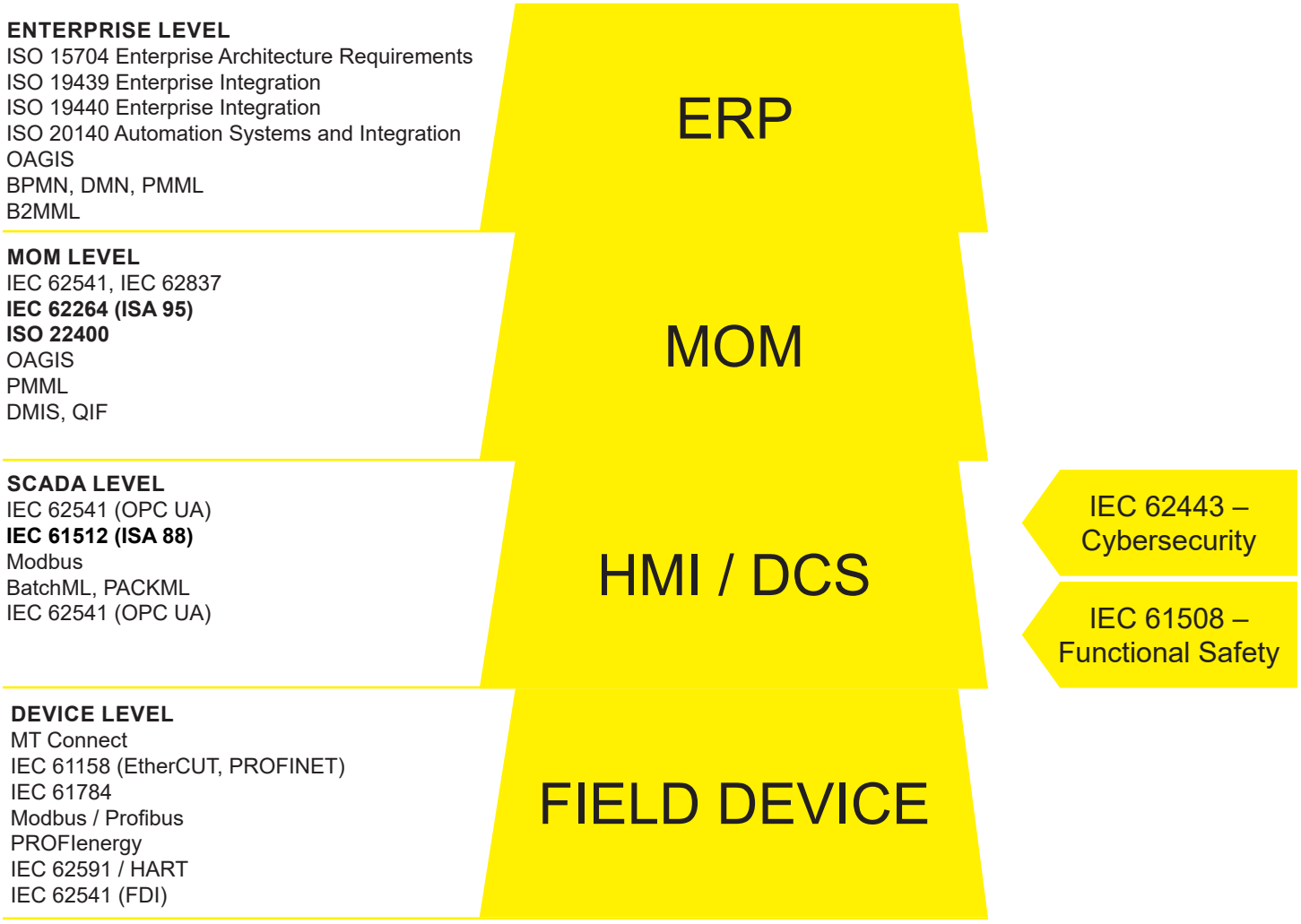
# Vertical integration – as the main application of standards

Within the aCampus project, we consider the relationship of the 5 standards that are relevant to vertical integration as follows, Figure 1. The first three standards ISO 22400, IEC 62264 and IEC61512 intersect very closely and are related to the integration of APCS with MOM, as well as MOM with ERP. The two safety standards are of direct relevance to APCS level systems, and also to new architecture at MOM level, which must take into account safety requirements for distributed, modern architectures implemented on industrial Internet of things technologies.

Within the aCampus project, the task was to clarify the challenges and status of each of the 5 standards, and to find common growth points.

# INTERNATIONAL STANDARDS THAT HAVE BEEN CONSIDERED AS PART OF THE PROJECT

1. Industrial KPIs
2. Integration of control systems
3. Batch processes APCS




5 standards
in the aCampus project
in the vertical integration pyramid

# TARGET AUDIENCE OF THE PROJECT

The project addressed expectations in 5 main stakeholder categories, and these are set out in the internal charter of the project team.

| | Stakeholder | Expectations |
|---|---|---|
| 1. | **APPAU** | 1) Conclusion of TC 185 on system work - regular harmonization of other standards in the same style.<br>2) Improvement in the motivation of experts, professional development of group leaders.<br>3) Attracting more experts to work in the TC.<br>4) Improving cooperation within the framework of TC 185 between different categories of APPAU participants – flow of educational content.<br>5) Developing a system toolkit for conducting development projects (not only by standards). |
| 2. | **Universities** | 1) Leadership in TC 185 in the field of standards education and market education.<br>2) Transition to monetization of services – formation of a service package.<br>3) Best motivation of experts involved in TC 185. |
| 3. | **Developers, Integrators** | 1) Access to standards.<br>2) Clarifications on application issues.<br>3) Exit and exchanges with real experts.<br>4) Access to customers, their professional development.<br>5) Recognition of own achievements. |
| 4. | **Industrial enterprises** | 1) Access to standards.<br>2) Clarifications on application issues.<br>3) Exit and exchanges with real experts.<br>4) Own professional development.<br>5) Arguments for buy-in. |
| 5. | **Ukrainian Agency for Standardization** | 1) Integration into Technical Regulation Support Programmes.<br>2) The success of the project, can be replicated for other TCs.<br>3) Combining with other similar projects (Twinning). |

The possible expectations of the donor, such as integration into the technical regulation support programmes of the Ministry of Economic Development and others were also considered separately.

# PROJECT TEAM AND PARTNERS

**The project team included 12 leading experts from APPAU and TC 185, including experts from technical universities:**

- National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute».
- National Aerospace University «Kharkiv Aviation Institute»
- Kyiv National University of Construction and Architecture.
- National University of Food Technologies.
- National University of Life and Environmental Sciences of Ukraine.

The main customer and coordinator of the work was the Executive Directorate of APPAU.

Information partners of the project became known enterprises, members of TC 185 and other high-tech communities – Interpipe, Metinvest Digital, IT-Enterprise, Digital Lean Kombinat, The Ukrainian Chamber of Commerce and Industry – Committee on Cyber Security, Softprom by ERC, Indusoft-Ukraine, Red & Blue team.

# Consideration of development issues in the field of standardization in the aCampus project

Consideration of the relevance of the objectives and expectations of the target groups to the results of the project can not be complete without providing a broader picture of the standardization challenges that were addressed in the aCampus project at its inception. In this section we will look at these challenges in more detail.

**Low level of awareness of manufacturers and developers in modern standards, understanding of their role and impact on technical policies and competitiveness growth**

The current list of international technical standards Industry 4.0 (modern industrial production) exceeds 60 IEC-

ISO standards. Before the beginning of the aCampus project, most of them were inaccessible and unknown to the general public of Ukrainian customers. Low awareness and understanding of standards by the market is the main reason for the poor use of standards, as well as other numerous challenges listed below.

The main approach in the solve this issue in aCampus project was in broad educational campaign to attract leading customers, universities and system integrators. The main features of this campaign are the flow of regular educational content, with the fixation of best and worst practices (mini-cases).

**Growing gap between the number of international standards and their acceptance and use in Ukraine**

The difference in the number of standards used by developed countries and Ukrainian customers is significant. In the field of industrial automation, most customers still use only 2 post-soviet standards – GOST 24 and 34, which date back to the early nineties. The majority of other standards in this field are either copied from Russian GOSTs (which are far ahead in terms of compliance with international IEC / ISO), or simply ignored. The Technical Committees, and in particular TC 185, were unable to cope with the requirements of rapid pace of harmonization due to low institutional capacity (lack of funding). The main approach in the solve this issue in aCampus project: initial focus on the 5 highest priority standards, which are brought up to the level of the DSTU. In the future, this list should be expanded.

**Challenges in cyber security and technology risks**

The two standards in this list belong to the security & safety category and go well beyond the narrow areas of Industrial Automation or IT. We talk rather about providing high security level on critical infrastructure, its defence from cyber and technogenic risks, to which the country is very vulnerable. In terms of cybersecurity, 90% of installed Control systems are easily accessible and vulnerable to cyber attacks. The degree of wear and tear of fixed assets at most such facilities, especially those owned by the State, ranges from 70% to 95%, which is the main factor in assessing man-made (technogenic) risks.

The main approach in the solve this issue in aCampus project: in addition to an educational campaign, the project focused on engagement of relevant government agencies.

**Low level of implementation of already harmonized standards**

APPAU's experience, in particular in addressing the situation of DSTU EN 15232 (Building Automation Standard, introduced in DSTU since 2011) suggests that the translation and harmonization of international standards to DSTU level is not enough. As all standards are subject to voluntary adoption by the market, this causes standards to be ignored or superficially

complied with in the technical policies of enterprises. In other words, even translated and brought to the level of DSTU, standards are not used in reality. The reason for this is disregard by enterprise managers of the requirements for compliance with technical standards as such, which are not directly related to short-term financial results.
The main approach in the solve this issue in aCampus project: a deeper study of enterprise motivation factors, focusing on the advantages of standards and their role in solving real problems, including the financial impact.

**Low institutional capacity of the Technical Committees, in particular – Technical Committee 185 «Industrial Automation»**

As it has already been said, TC 185 since its creation (2017) had no financing and most of the work was done on a voluntary basis. In TC were created 5 subcommittees, but in reality all works were kept on enthusiasm of 2–5 experts. Attempts to attract funding from APPAU members and the market were not successful, including for the reasons mentioned above (paragraphs 2.1 and 2.4).

The above mentioned challenges are listed in the initial application form for the project donor as the main ones.

In addition, the project considered other challenges that are more relevant to the internal growth and development problems of the APPAU and Industry 4.0 expert community.

- **Low ability of technical universities, members of APPAU, to provide quality educational content for Ukrainian customers.**
From 2012 to 2019, APPAU tried to delegate the issue of generating educational content to technical universities. Educational content is the basis for accelerating the market launch of numerous innovative products and solutions, which are numerous in industrial automation and IT, as well as standards. Although there were 17 technical universities in the association by 2019, there were no more than 3 issuing quality educational content.

  In the aCampus project, the APPAU's goal was to establish a flow of educational content, and from universities

- **The low level of expert collaboration in general on the committees and groups managed by APPAU.**
This problem refers to the weak interaction of experts in solving already known problems. Most of all, it was manifested in the gap between individual experts of TC 185 and customers or integrators, who continued to ignore the provisions of the standards.

  APPAU initially regarded this as a challenge, for which a special resource was allocated and appropriate methodologies were included (on this further in section xx).

- **«Whitewash» or simulation of results.** The challenge is involved in a number of projects that APPAU sees in its environment or among partners, and where donor funding from the EU does not make any significant changes in addressing real market issues. The simulation of results or projects – «simulacras» – lead to a «granteating» effect and undermine market confidence in the expert environment, government structures as well as in the EU technical assistance itself. This challenge was also addressed at the beginning of the project and specific, relevant to the KPI objectives were identified.

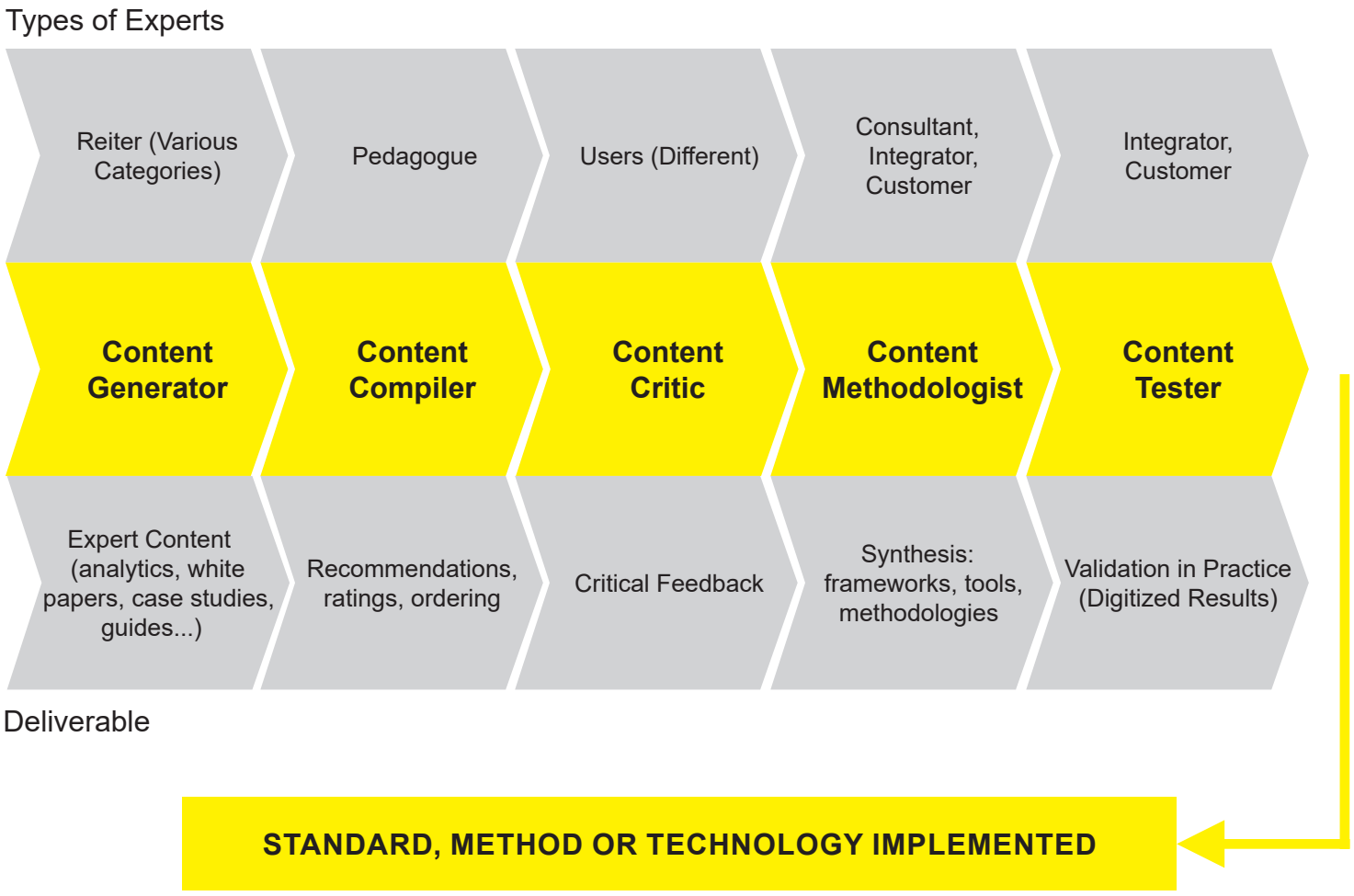
**THESE THREE CHALLENGES WERE NOT PART OF THE ORIGINAL PROJECT'S GRANT APPLICATION, BUT WERE NEVERTHELESS CONSIDERED DURING THE PROJECT AND THIS REPORT INCLUDES THE RESULTS OF THEIR IMPLEMENTATION.**

## Overview of analytical developments in the project

For the development of such cooperation and in conditions of extremely limited resources of highly qualified experts and shortage of their time, the main factor of success is the correct distribution of roles among experts of different categories of market participants.

In particular, APPAU proposed 5 key roles and implemented this approach in the ISO 22400 group.

In general, this approach proved to be successful in the first 3 months of the project. The work of the experts was most successfully demonstrated through collective discussions in workshops and group meetings.




Distribution of expert roles in the project

# Overview of analytical developments in the project

The methodology and plans of the aCampus project provided a clear and concrete focus on the challenges of the Ukrainian market in relation to the world development. Formulation of such a list of challenges – and in each of the 5 areas of different standards – is a complex task, especially given the relative novelty of standards, poor knowledge of the market and traditionally low readiness of end customers (manufacturing enterprises) to provide feedback. In this context and at the end of November 2019, the following tasks were fulfilled in aCampus project:

**01 Surveys**

Online surveys have been conducted according to all 5 standards and the results are available at www.tk185.appau.org.ua.

**02 Interview**

Conducted focus interviews, in which more than 20 market experts participated. Most of these interviews were recorded in the form of public articles on the websites tk185.appau.org.ua and appau.org.ua, as well as quotations in white papers.

**03 Events**

Within the framework of the aCampus project, as well as within the framework of other APPAU activities, 9 group, expert meetings were held, where the standards and issues of establishing teamwork of experts were discussed, in particular the following events in autumn 2019:

On September 4, the meeting of the «Fifth Element» club took place, where the issue of KPI synchronization was raised for the first time. On September 18, there was a broad exchange of specialists from the 2 holding companies Interpipe and Metinvest, where the issue of vertical integration and standards was also discussed. On October 25, at the seminar on traceability in the Food Industry the issue of IEC 62264 and IEC 61512 standards was raised again. On October 11, a special seminar on vertical integration was held. On October 18, the 2nd meeting of the «Fifth Element» club was held, where Interpipe's experience in forming KPI indicators was considered in detail.

On October 25, a seminar on ISO 22400 standard was held. On November 11, a working group on OT Cyber Security was formed and its list of tasks was also defined.

On November 11, a web conference of TC 185 experts was also held, where the subject matter of vertical integration was discussed in more detail.

On November 20 the issues of collective cooperation and optimization of working methods of TC 185 experts were discussed (report in the work).

**04 White Papers**

5 white papers published.

**05 Cases**

For the TRANS4MATION forum, APPAU has also released a special Interpipe case study benchmarking «Industry Course 4.0», which includes a section describing their KPIs and the contribution of technology to them.

In general, these meetings were attended by more than 150 different specialists of industrial APCS-IT, and information about them via online channels covers an audience of about 1000 specialists. However, within the given context, the main results of these meetings and discussions should be considered not so much the acquaintance of the market with the basic provisions of standards, as:

**01 Knowledge Base**

Initial formation of knowledge base in the form of available standards (in Ukrainian), white papers, presentations, reports and recorded expert opinions.

**02 Calls**

Crystallization of key development issues (challenges) in relevant areas of influence of standards.

**03 Experts**

Formation of these expert teams.

# Main Results

Project activities were carried out in accordance with the detailed action plan established at the beginning and with regular monitoring of quantitative and qualitative performance indicators.

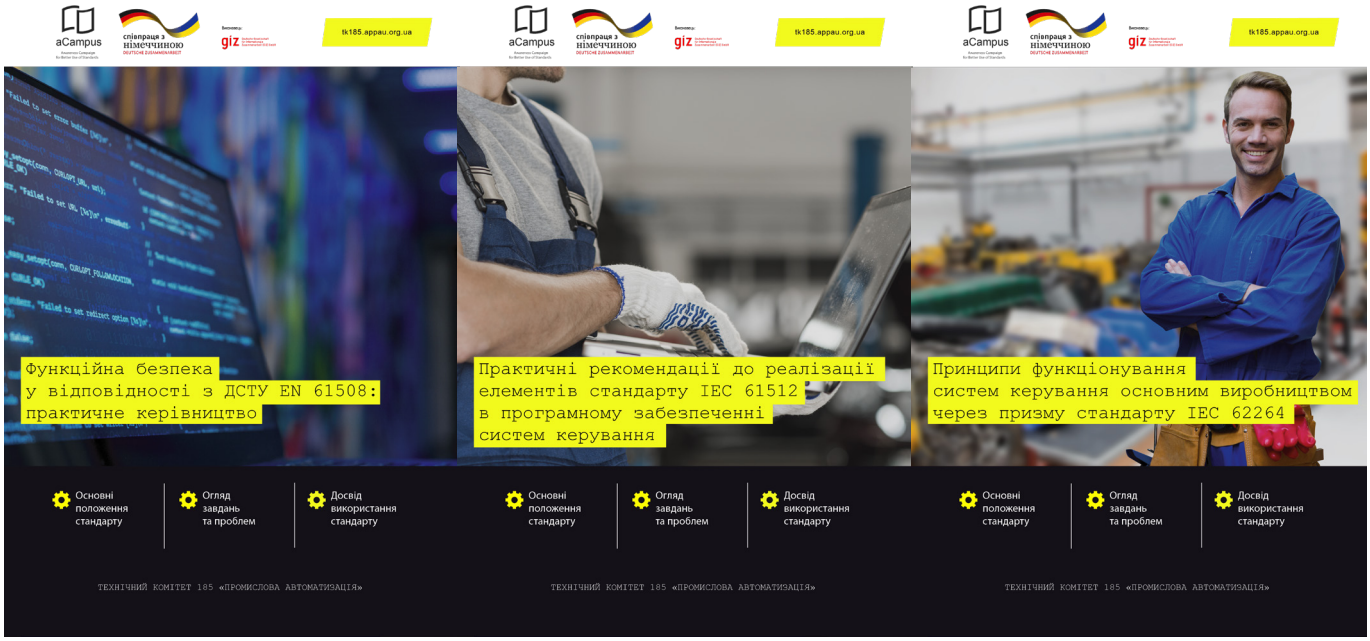
# Evaluation of process KPIs

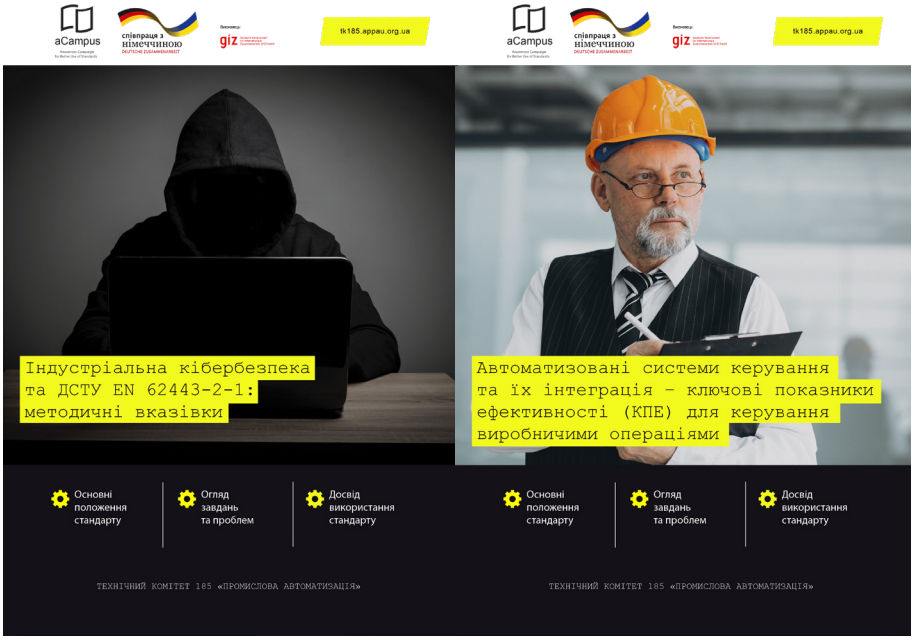
Process quantitative indicators are measured according to the work plan

| | KPI description | Planned indicator | Actual indicator | Comment |
|---|---|---|---|---|
| **A** | Number of educational content units | | | |
| 1. | Translated standards | 5 | 5 | Details – see TC 185 website |
| 2. | Published white papers | 5 | 5 | Details – see TC 185 website |
| 3. | Analytical reports | 2 | 2 | Details – see TC 185 website |
| 4. | Gaidi benefits | 5 | 5 | Details – see TC 185 website |
| 5. | Articles | - | 30+ | On 3 sites, also in technical magazines. |
| 6. | Promotional Content in SMM | - | 100+ | Facebook + Linkedin (5) |
| **B** | Promotional activities | | | |
| 1. | Seminars | 3 | 5 | Kyiv, Kharkiv |
| 2. | Conferences | 1 | 2 | Kyiv, Kharkiv |
| 3. | Webinars | - | 2 | Details – see TC 185 website |
| **C** | Number of project partners | | | |
| 1. | Partners in different categories | 5 | 6 | Interpipe, Metinvest Digital, IT-Enterprise, Softprom by ERC, Indusoft, Red&Blue team |
| 2. | Technical Universities | - | 6 | 5 in the project, also ONAFT |

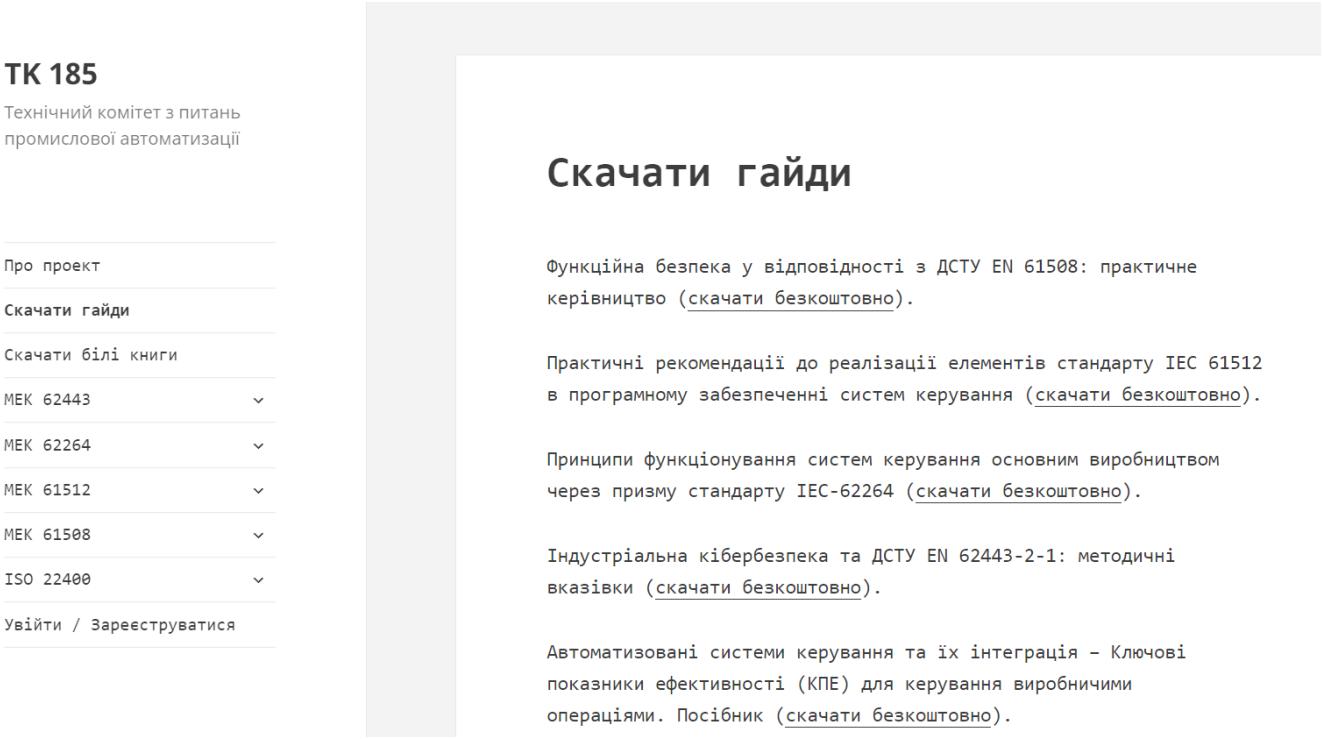
# WHITE PAPERS
# of aCampus project


# GAIDAS
# of aCampus project



# WEBSITE
# of aCampus project



**ТК 185**

Технічний комітет з питань промислової автоматизації

- Про проект
- **Скачати гайди**
- Скачати білі книги
- МЕК 62443
- МЕК 62264
- МЕК 61512
- МЕК 61508
- ISO 22400
- Увійти / Зареєструватися

## Скачати гайди

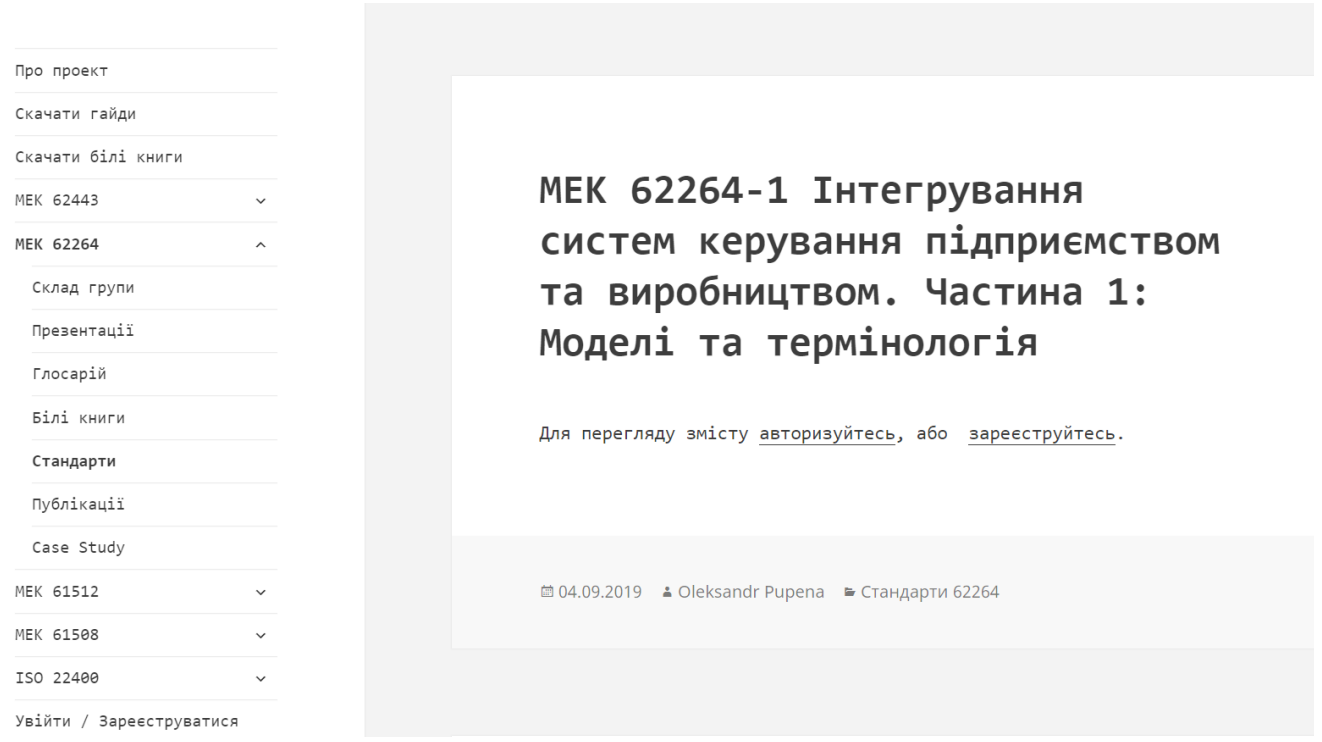
Функційна безпека у відповідності з ДСТУ EN 61508: практичне керівництво (скачати безкоштовно).

Практичні рекомендації до реалізації елементів стандарту IEC 61512 в програмному забезпеченні систем керування (скачати безкоштовно).

Принципи функціонування систем керування основним виробництвом через призму стандарту IEC-62264 (скачати безкоштовно).

Індустріальна кібербезпека та ДСТУ EN 62443-2-1: методичні вказівки (скачати безкоштовно).

Автоматизовані системи керування та їх інтеграція – Ключові показники ефективності (КПЕ) для керування виробничими операціями. Посібник (скачати безкоштовно).



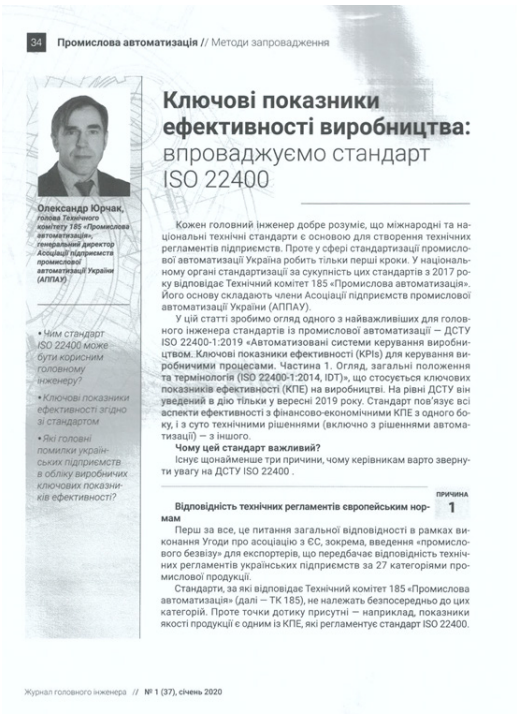
- Про проект
- Скачати гайди
- Скачати білі книги
- МЕК 62443
- **МЕК 62264**
  - Склад групи
  - Презентації
  - Глосарій
  - Білі книги
  - **Стандарти**
  - Публікації
  - Case Study
- МЕК 61512
- МЕК 61508
- ISO 22400
- Увійти / Зареєструватися

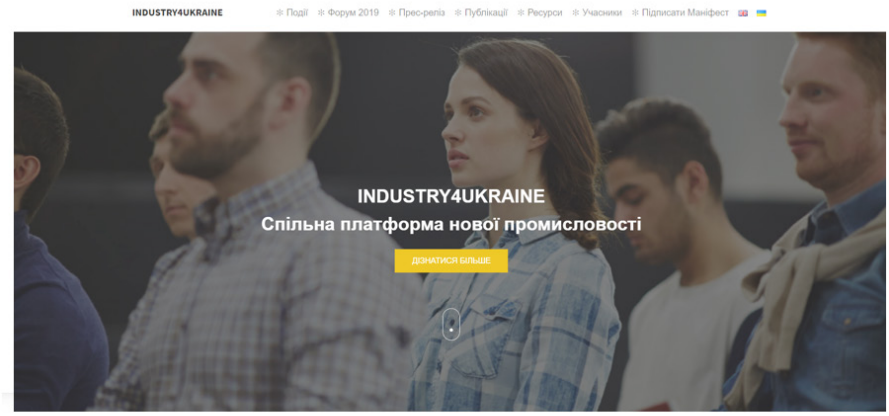
## МЕК 62264-1 Інтегрування систем керування підприємством та виробництвом. Частина 1: Моделі та термінологія

Для перегляду змісту авторизуйтесь, або зареєструйтесь.

04.09.2019 Oleksandr Pupena Стандарти 62264

# PUBLICATIONS
# within the aCampus project


## Повертаючи смак стандартів як кращих практик

Posted on 10.09.2019 | by Yurchak Alexandre

Більшість сучасних управлінців прекрасно знає та розуміє, що міжнародні стандарти – це не стільки про корпоративну або державну бюрократію та-чи обмеження, скільки про кращі практики. Як військовий статут написаний кров'ю, так і міжнародні стандарти написані як результат багаторічних зусиль та глибокого осмислення кращих практик в світовому масштабі.

До роботи міжнародних експертів, серед яких ми обов'язково знаходимо лідерів ринку – практиків, але також університети та науку, – слід додати довгі роки бурхливих дебатів, суперечок, порівнянь результатів й кінцевої валідації того, що є найбільш ефективним в тій чи іншій сфері. Отже, не втомлюємось повторювати, що стандарти – це про **кращі практики в світовому масштабі.** Використання яких надає економічний ріст, міжнародне визнання, полегшення входу на нові ринки, оптимізацію витрат та багато інших переваг.

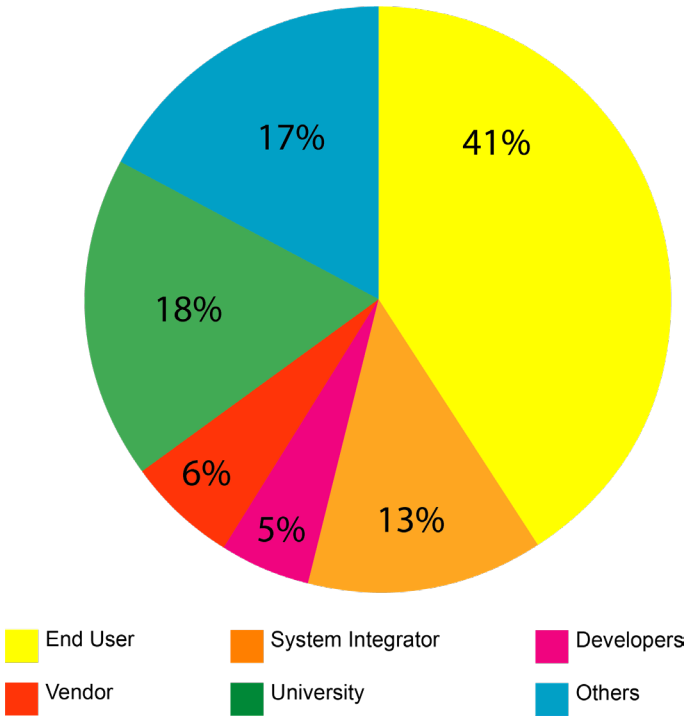
Логічно тоді задати собі питання, чому сприйняття технічних стандартів в Україні залишається до певної міри «одіозним» – тобто, асоційованим з чимось неймовірно нудним, бюрократичним та формальним? Й що в результаті веде до їх ігнорування. Наприклад, в сфері промислової автоматизації та IT й вже в рамках нової Індустрії 4.0, куди прямує весь світ діє близько 60 міжнародних стандартів. Серед них є вузькотаргетовані, як мережеві обміни чи інформаційні моделі обміну даними. Але є й куди більш зрозумілі кожному управлінцю.

# Evaluation of quantitative KPI, which are baseline (as a result of achieving process)

Quantitative indicators are measured according to the established indicators.

| | KPI description | Planned indicator | Actual indicator | Comment |
|---|---|---|---|---|
| **A** | Involvement in project issues | | | |
| 1. | Number of engaged users | 700 | 470 | Number of contacts according to registrations in all online and offline channels |
| 2. | Number of organizations involved | 150 | 135 | Number of organizations as per registrations in all online and offline channels |
| 3. | Among them – enterprises – end customers (organizations) | - | 41% | |
| 4. | System integrators and developers (organizations | - | 18% | |
| **B** | Established practices (mini-cases) | | | |
| 1. | Expanded cases and mini-cases | - | 20+ | |
| 2. | References, interviews, expert opinions | - | 30+ | |

Distribution of involved organizations by categories



# Quality KPI assessment

**1. The beginning of this implementation of standards in Ukraine in the field of industrial automation. Since September 1, 2019 by the order of SE "UkrND-NC"(the nanional standardization body) № 249 national standards, harmonized with European and international standards, were introduced by the method of confirmation with the entry into force:**

| | |
|---|---|
| 1. DSTU EN 61508-1:2019 (EN 61508-1:2010, IDT; IEC 61508-1:2010, IDT) | Functional safety of electrical/electronic/ programmable electronic safety-related systems – Part 1: General requirements — For the first time |
| 2. DSTU EN 61508-2:2019 (EN 61508-2:2010, IDT; IEC 61508-2:2010, IDT) | Functional safety of electrical/electronic/ programmable electronic safety-related systems – Part 2. Requirements for electrical/electronic/programmable electronic safety-related systems; — For the first time |
| 3. DSTU EN 61508-3:2019 (EN 61508-3:2010, IDT; IEC 61508-3:2010, IDT) | Functional safety of electrical/electronic/ programmable electronic safety-related systems - Part 3. Software requirements — For the first time |
| 4. DSTU EN 61508-4:2019 (EN 61508-4:2010, IDT; IEC 61508-4:2010, IDT) | Functional safety of electrical/electronic/ programmable electronic safety-related systems – Part 4. Definitions and abbreviations — For the first time |
| 5. DSTU EN 61508-5:2019 (EN 61508-5:2010, IDT; IEC 61508-5:2010, IDT) | Functional safety of electrical/electronic/ programmable electronic safety-related systems – Part 5. Examples of methods for the determination of safety integrity levels — For the first time |
| 6. DSTU EN 61508-6:2019 (EN 61508-6:2010, IDT; IEC 61508-6:2010, IDT) | Functional safety of electrical/electronic/ programmable electronic safety-related systems – Part 6. Guidelines on the application of IEC 61508-2 and IEC 61508-3 — For the first time |
| 7. DSTU EN 61508-7:2019 (EN 61508-7:2010, IDT; IEC 61508-7:2010, IDT) | Functional safety of electrical/electronic/ programmable electronic safety-related systems – Part 7. Overview of techniques and measures — For the first time |

| | |
|---|---|
| 8. DSTU EN 61512-1:2019<br>(EN 61512-1:1999, IDT;<br>IEC 61512-1:1997, IDT) | Batch control – Part 1: Models and terminology<br>— For the first time |
| 9. DSTU EN 61512-2:2019<br>(EN 61512-2:2002, IDT;<br>IEC 61512-2:2001, IDT) | Batch control – Part 2: Data structures and guidelines for languages<br>— For the first time |
| 10. DSTU EN 61512-3:2019<br>(EN 61512-3:2008, IDT;<br>IEC 61512-3:2008, IDT) | Batch control – Part 3: General and site recipe models and representation<br>— For the first time |
| 11. DSTU EN 61512-4:2019<br>(EN 61512-4:2010, IDT;<br>IEC 61512-4:2009, IDT) | Batch control – Part 4: Batch production records<br>— For the first time |
| 12. DSTU EN 62264-1:2019<br>(EN 62264-1:2013, IDT;<br>IEC 62264-1:2013, IDT) | Enterprise-control system integration – Part 1: Models and terminology<br>— For the first time |
| 13. DSTU EN 62264-2:2019<br>(EN 62264-2:2013, IDT;<br>IEC 62264-2:2013, IDT) | Enterprise-control system integration – Part 2: Object and attributes for enterprise-control system integration<br>— For the first time |
| 14. DSTU EN 62264-3:2019<br>(EN 62264-3:2017, IDT;<br>IEC 62264-3:2016, IDT) | Enterprise-control system integration – Part 3: Activity models of manufacturing operations management<br>— For the first time |
| 15. DSTU EN 62264-4:2019<br>(EN 62264-4:2016, IDT;<br>IEC 62264-4:2015, IDT) | Enterprise-control system integration – Part 4: Objects models attributes for manufacturing operations management integration<br>— For the first time |
| 16. DSTU EN 62264-5:2019<br>(EN 62264-5:2016, IDT;<br>IEC 62264-5:2016, IDT) | Enterprise-control system integration – Part 5: Business to manufacturing transactions<br>— For the first time |
| 17. DSTU EN IEC 62443-4-1:2019<br>(EN IEC 62443-4-1:2018, IDT;<br>IEC 62443-4-1:2018, IDT) | Security for industrial automation and control systems – Part 4–1: Secure product development lifecycle requirements<br>— For the first time |

| | |
|---|---|
| 18. DSTU ISO 22400-1:2019 (ISO 22400-1:2014, IDT) | Automation systems and integration – Key performance indicators (KPIs) for manufacturing operations management – Part 1: Overview, concepts and terminology — For the first time |
| 19. DSTU ISO 22400-2:2019 (ISO 22400-2:2014, IDT) | Automation systems and integration – Key performance indicators (KPIs) for manufacturing operations management – Part 2: Definitions and description — For the first time |
| 20. DSTU ISO/TR 22400-10:2019 (ISO/TR 22400-10:2018, IDT) | Automation systems and integration – Key performance indicators (KPIs) for manufacturing operations management – Part 10: Operational sequence description of data acquisition — For the first time |

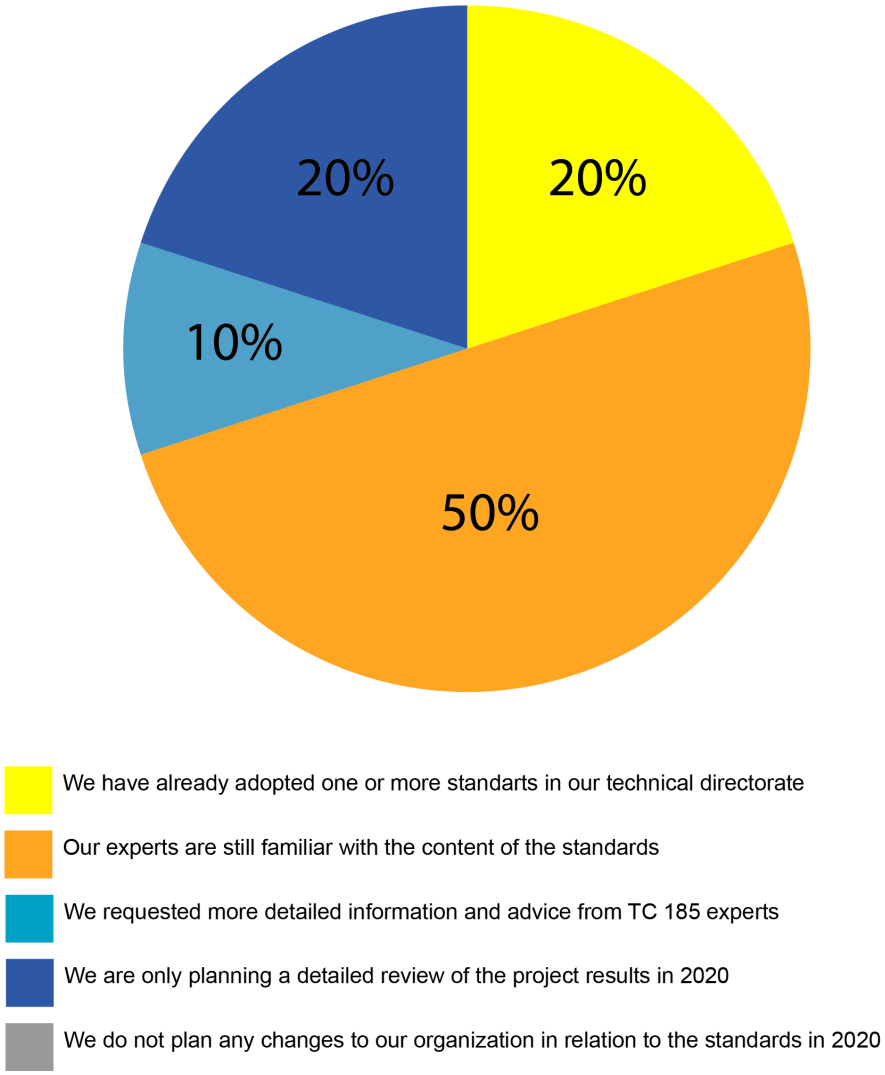
**2. Adopted the amendment of the national standard harmonized with the international standard by confirmation method with effect from 1 September 2019:**

| | |
|---|---|
| 1. DSTU ISO 22400-2:2019 (ISO 22400-2:2014, IDT)/ Correction № 1:2019 (ISO 22400-2:2014/ Amd 1:2017, IDT) | Automation systems and integration – Key performance indicators (KPIs) for manufacturing operations management – Part 2: Definitions and description |

**Other important qualitative results of the project – according to the survey of the project team as well as market participants:**

1. In addition to bringing international standards to the level of the DSTU, the expert community identifies the following 3 project achievements as the main ones:
   a. Flow of regular educational content.
   b. Significant improvement in knowledge and understanding of standards.
   c. Creating numerous cases and mini-cases explaining the benefits of standards.
2. The quality of educational content fully or partially satisfies the target audience by 97%.
3. Despite the advantages of online, the project audience considers face-to-face contact to be the most valuable and recognizes the most effective

Degree of influence on enterprises




channel for group presentations with print distribution.

4. The project team recognizes the issue of attracting specialists and companies from the market as a challenge. It turned out to be more difficult than expected.
5. The level of influence on enterprises is fixed as follows.

Based on thia information and results, the main goals of the project are to be considered as completed.

# Important insights of aCampus project

Among all project results, it is worth highlighting some insight that are relevant not only to the sphere of technical standards, but to all or most of the development projects in APPAU and Industry 4.0. aCampus has provided a wealth of material for observations and conclusions regarding all the challenges identified in Chapter 2. Some of the insides presented below were quite predictable, while others were largely unexpected. Some of them are quite positive and present markers of change. Others are counterverse, that is, they have both positive connotations and point to specific growth areas. But all of them require attention, awareness and further development of expert assess-

ments. One way or another, these are elements of the overall picture of the expert community in the field of industrial automation and IT Ukraine.

## THE PROGRESS IN WHITE PAPERS DEVELOPMENT

5 white papers, for the first time in the history of APPAU and TC 185 were published in aCampus project. Their role is to convey the basic provisions of the standards in the context of market challenges in a simple and accessible language. They include survey results and refer to numerous testimonies from market experts. Feedback on these papers in the aCampus project is very positive. Many users provided high scores, of which the main ones were «for the first time – and in simple language». Writing white papers was also a good practice for experts from universities, most of them writing for the first time as well.

The appearance of 5 white papers from APPAU experts was a real breakthrough in the field of educational, expert content in industrial Control system – IT. Though APPAU repeatedly communicated about obvious imbalances in this area (namely – surplus of PR and/or foreign, rather than domestic content), for 9 years of association existence, no market player could provide its own, original content in the category of white papers. Meanwhile, white papers and guides are the content #1 in the field of market education in complex and industrial high-tech markets, including the promotion of technical standards.

## DEVELOPING BASIC KNOWLEDGE MANAGEMENT FRAMEWORKS

In the initial approach to educational content creation, the client (APPAU Executive Directorate) raised the issue of considering the project issues in the broader context of knowledge management. The huge amount of diverse content generated in the market does not mean the order, structure or availability in a particular subject area. Accordingly, the project's 3rd teams were given the task of initially operating under unified rules that provide for further availability and scaling of content. The main tool in this was a separate website by standards. Separately, a great emphasis was placed on the distribution of roles. In particular, the roles of content generators and content producers, testers, etc., were separated in the project. For more details, see this link.

In general, these rules have proved to be quite positive. Difficulties arose precisely in the management of collaboration teams. This style requires additional training of team leaders, and above all, their training.

## BEST PRACTICES IN DEVELOPMENT PROJECT MANAGEMENT

In order to perform a set of project tasks, the team tested and adopted a variety of project management practices and other management methods. At the end of the project, the best should be recognized:

1. Weekly regular Skype conferences of the project team.
2. Monthly reporting, including plan-fact monitoring and problem monitoring.

3. Summing up all important events in separate reports.
4. Personal discussions in complex or conflict situations.
5. Correct project structure. In particular, the need for separate management positions was suggested by the donor himself – this is due to the complexity of official reporting.
6. Separation of roles in the project team, with strong support from experts by marketing roles (design, communications, quality graphics, mechanisms of lidogeneration and accounting of involved persons).
7. Attracting project partners. Although our expectations were higher here, organizations from all target categories joined the project as partners.

## PROCESS, GAME MODELS FOR TECHNICAL COMMITTEES

A good find in the aCampus project was the game, which teaches methods of collaboration of different categories in the development of standards. In general, the game immediately liked and was taken to work by universities and members of TC 185. The main educational and methodological advantage is the explanation of the key process and instrumental aspects in cooperation. In the aCampus project, we immediately applied these methods to problematic aspects. In particular, the methods of «developing ideas» and «creating consensus» proved to be weak points in the individual project team, so this model was useful for a better understanding of these aspects. For more details – see the article on this topic by the chairman of TC 185 Yurchak O.V. It is interesting that the former head of SE «UkrNDNC» Sergey Shevtsov, who is a member of TC 185, proposed this game.

## THE IMPORTANCE OF FIXING CASES VS THEIR SMALL NUMBER. CLOSED MIND OF END USERS

The problem of developing ideas and building consensus around them (conclusions, next steps, new engagements ...) clearly manifested itself in problematic of mini-cases creation. In the aCampus project, more than a dozen of them were generated around the practical problem aspects of large customers and integrators. For example, the project has well documented production problems around automated accounting (which is important for the ISO 22400 standard) or batch production management. Described in short form, mini-cases or staged tasks in corresponding white papers and analytical report on vertical integration, such mini-cases should generate corresponding debates and engage leading specialists who have answers and their own thoughts. However, this did not happen. The experience of aCampus says that enterprise specialists react only to face-to-face communications, while outside such meetings specialists' behavior remains quite closed.

Similarly, even a more detailed and perfect case – presentation of «Radiy» – did not cause any public debate. This is the only example of all 5 standards of real implementation of the standard in the technical policy of the enterprise, and it has outstanding results. Thanks to the full implementation of the standard IEC 61508 «Radiy» has received and is receiving more and more new export wins. But «Radiy» also managed to use this standard to transform its R&D processes and design, thanks to which the time of release of new products has been reduced by tens of %.

Already having experience in promoting Interpipe and FED case studies we can confidently state: yes, the market and specialists benefit from such case studies, they are needed and help in development. But in 95% of cases, enterprises do not give any feedback, do not hurry to open their own problems and do not come into contact with the experts of the TC in order to create such cases together – real, deep and insightful. Such closed behaviour significantly complicates the task of adaptation – introduction of standards (as well as – innovations) and does not help to involve more distant categories like universities in the market tasks.

However, the experience of aCampus says that «breaking through this wall» is possible by putting the real leaders on the front line. Olexander Pupena (NUFT), Eugeny Kovnir (DTEK) and Maxim Tyutyunnik (APPAU) have proved to be such leaders in the project. Their role is typical for consulting – when key questions and «pain points» are presented in detail and by examples. Leaders also not only explain, but also guide – they set vectors and pace of development.

## DEPENDENCE OF UNIVERSITY EXPERTS ON THE HIGHER EDUCATION SYSTEM – MORE THAN EXPECTED

Betting on experts from the university environment as the main generators of educational content in general has fully justified itself. Experienced lecturers, most of whom have practical experience, are quite capable of generating a stream of expert content. They are disciplined and are capable of methodically and professionally practicing all provisions of standards. At the same time, we have seen 'system' limitations. The first one is the lack of time. Teachers practice project tasks mostly outside working hours and on weekends. This reason provokes the following, the second limitation is the lack of motivation to do something more outside of the task, which is provided for an additional fee. Within the Total Project and in spite of calls to join, only 2 university employees participated in the work on a non-paying basis. On the contrary, even those professors who worked in TC 185 as volunteers «fell out» of the work when it was found that their colleagues were working on a paid basis. At the same time, the abundance of teachers among the involved audience of the project (18%) may indicate that the content of the project is actually important and in demand in the technical universities of the country. But it is obvious that this mode of interaction was passive, and rather consumer.
To sum up, the aCampus project did not give any new incentives, except for paid ones, to motivate universities to better integrate into TC 185 and the market environment. Rather, on the contrary – we see that the percentage of enthusiasts (the first to line up from the NUFT team), as it was, remained the same.

The possible way out of this problem is the commitment of the Centers 4.0. Center 4.0 «Odessa» was moving in parallel outside the aCampus project and translated several parts of the standards, which relate to robotics. So, as a conclusion, collective discipline and commitment are just as important as individual motivation.

На фото члени ТК 185

## ENGAGING CUSTOMERS – THE COMPLEXITIES OF INFLUENCING TECHNICAL POLICIES AND FIRST PERSONS

End users closure, as the main behavioral trait, is already mentioned in item 4.5 cherry. Expanding these theses to the issues of formation of technical policies, it should be noted that with the exception of «Radiy», which already has technical policies based on IEC standards, we have not identified any other enterprise in Ukraine, which would be obviously interested in 5 standards in the project at the level of technical directorates of enterprises. It is still difficult to interpret the interest of individual mid-level specialists as a conscious intention to integrate standards into technical policies of enterprises. In the opinion of the executive management of APPAU, this is an erroneous behavior, alienates the interests of IT and Control system departments directors from solving their own development problems. Simply speaking, directors should accept and introduce standards in technical policies at times faster as it at once opens a way for them to multiple advantages, including in tactics buy-in (internal sale) with a management. For example, the introduction of cyber security or functional safety standards automatically resolves the issue of TOR in relevant tenders and can provide modern and better products and solutions as requirements.

## WEAK RESPONSE FROM DEVELOPERS AND VENDORS

The low level of understanding of the role of standards and their benefits also manifested itself among the vast majority of developers and vendors. APPAU members from these categories were offered advantageous terms of engagement – for small financial support of numerous events (which went beyond the mandatory events and at the expense of the donor), they had access to

the Lido database, PR and advertising in numerous communications media. Counted companies responded to this offer. Among the most effective are Indusoft-Ukraine and Softprom by ERC. To a certain extent, the vendors have lost the obvious opportunities, because and as APPAU's experience shows, the conversion of lids to order takes place with some delay in time. That is, the demand and interest of customers for cases and related solutions will still grow, but very few companies get these benefits.

To some extent, this may indicate 2 things: 1) most international vendors do not understand the role of standards themselves (even if their products and solutions support them); 2) vendors still do not believe in the usefulness of lidogeneration practices through online channels.

At the same time, attracting 6 integrators and customers as project partners meets the targets. And so, how to start such system engagements is a good result.

## CHANGE AGENTS IN ACAMPUS PROJECT – ADDITIONAL TRAINING AND BETTER ROLE ASSIGNMENT IS REQUIRED

Analytical review «Agents of Change: 5 roles of leaders in the Industry 4.0» summarizes progress on a number of Ukrainian Industry 4.0 projects, including the aCampus project. Among the nominees for 2019 was Oleksandr Pupena, head of subcommittees for IEC 61512 and IEC 62264.

Among the 5 roles identified – Match & Connect, Orient & Drive, Communicate, Build trust, Consult & Educate, we note that all of them were largely needed in the project aCampus. The team coped well with 3 roles – Communicate, Build trust, Consult & Educate. In particular, by dividing these roles between different specialists, primarily between product experts and marketing communications specialists. But the roles of Match & Connect, Orient & Drive in several teams required a higher level. As the main result, we had a weak involvement of market experts from enterprises and customers. The review «Agents of Change» shows that this situation is typical for most development projects in Ukraine. The best performance of all 5 roles requires 2 basic conditions – the best combination of different role models in the team, but also the best (special) training – training change leaders. These conclusions fully apply to the aCampus project.

## LANGUAGE IS LIKE A LIVING STRUCTURE THAT NEEDS CARE AND DEVELOPMENT

Very interesting in the project team was the initial period of August–September 2019, when work on a single glossary continued. The team faced many difficulties in translating into Ukrainian, and searching for the most relevant terms. There were several interesting things to look for. In the area of common terms, the team learned a lot from the early developments of SE «UkrNDNC» technical committees, in particular DSTU 2391-2010. Also, a lot of ready-made terms were found by security standards. But in other standards, in particular, batch production, integration of management systems and production, many terms had to be defined from scratch. It did not help much to attract specialists from the market. It turned out that the majority

of advanced enterprises in Ukraine still use Russian definitions. This work, with gradual self-awareness and conviction of the importance of using the state language, getting used to the terms, and also understanding the advantages of our translation over Russian GOSTs (where many mistakes have been made in translations), showed that language is a living structure. But in order to fully use it in all spheres of activity, the language needs care, development and, of course, constant consumption.


# Lesson learned

Lesson learned is a mandatory part of summarizing. General recommendations, plans and rules for further development follow from the lessons. Summing up all the lessons and clarifying them requires discussion, also outside the project team. This will be done at the final conference on February 26th.

Now the view of the project client (AP-PAU executive management) focuses on the next 5 lessons.

## 1. «STANDARDS IS A LANGUAGE THAT UNITES»

This famous slogan of the technical committees we heard in the summer in SE «UkrNDNC» within the Twinning project, which was launched by this state institution in cooperation with standardization agencies of 5 European countries. In our project we had a repeated opportunity to see the fairness and deep meaning of this thesis. The 5 standards that were the basis of the project united and brought us closer to each other with numerous partners from different categories of market participants. These are partners from the German Society for International Cooperation GIZ, SE «UkrNDNC», 5 Ukrainian universities, numerous managers and specialists from industrial enterprises and system integrators, some vendors, expert communities on safety and integration of production management systems. At the same time, we worked to ensure that international standards become the basis for technical policies for hundreds of Ukrainian enterprises that need it.

## 2. THE WORK OF THE TECHNICAL COMMITTEES SHOULD TAKE PLACE ON A PERMANENT, REGULAR BASIS

The project team has fully implemented the plan and in many aspects exceeded it. At the same time, the completed front of work did not become a real restart of the Technical Committee 185. We saw that many colleagues, experts of the committee were left aside and other important standards, which also need to be promoted in Ukraine, with rare exceptions, have not made any progress. This dependence solely on donor funding is not «normal». The project clearly showed the progress in promoting the 5 standards, their importance for the development of Ukrainian industry, the main role in this work of the Technical Committee. 100% of respondents in surveys of both the market and the expert team said that such projects (works) should be continued. But how to conduct these works without sustainable funding, how to bring the work of TC 185 on a sustainable basis of continuous, regular cooperation of experts – the project has not yet given a clear answer to these questions.

## 3. THE INVOLVEMENT OF INDUSTRIAL END USERS REMAINS A GREAT CHALLENGE FOR THE EXPERT COMMUNITIES

One of the main issues in financing TC 185 remains the inertia of Ukrainian end users. Among them, the consumer behaviour dominates, when the tasks of sustainable and state development, including the sphere of standardization, should be performed by «someone». This someone is, in fact, a small business, because it was the vendors and integrators who were the main initiators of TC 185. In the works of aCampus and in relation to each standard there are many examples of their advantages for industrial enterprises, including in terms of creating competitive advantages, security and financial results. So, it's not about having advantages. Rather, it is about the fact that the level of technical directorates and the role of international standards in the technical policies of the enterprise remain low. This is certainly a challenge for the APPAU community and more broadly for all industrial sectors.

## 4. SYNERGY BETWEEN UNIVERSITIES AND MARKET PARTICIPANTS IS POSSIBLE. BUT THE CHOICE AND TRAINING OF TEAM LEADERS REQUIRES ADDITIONAL EFFORTS FROM BOTH UNIVERSITIES AND MARKET PARTICIPANTS.

An important lesson of the project is to demonstrate the ability to unite and cooperate university teams. This is an important lesson in the context of total competition between universities, which was discussed at the December conference of universities in the National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute». At the same time, the leadership of Centres 4.0 in such projects in relation to customers and integrators requires additional training of team leaders, better mentoring and assistance, including from market participants themselves. After all, the project has clearly proved what APPAU has been talking about for many years – the country's technical universities are a powerful source of not only training. Industry 4.0 Centres of Expertise, which have been and will be established on the basis of leading technical universities, can also act as leaders in innovation, market education, fundraising, and standardization. This awareness and steps towards universities in all these areas is important for all market participants.

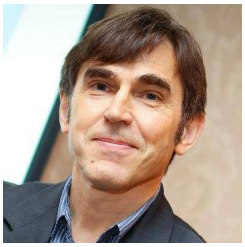
## 5. PROFILING (CLARIFICATION AND EVOLUTION) OF ROLES IN COLLABORATIVE TEAMS IS KEY TO SUCCESS IN COMPLEX DEVELOPMENT PROJECTS

The project laid the foundation for a new round of cooperation in TC 185 and APPAU – exactly in knowledge management. The collaborative team model proposed by the project has proven to be quite successful. At the same time, the evolution and success of such teams depend on two important conditions – proper selection of specialists in specific roles, and team management as a whole. The aCampus project has only taken the first steps in this direction. It is important to further develop these approaches in other TC 185 and APPAU projects.

APPAU Executive Directorate sincerely thanks all participants of the project team, our partners and all specialists, market participants, who were involved in or benefited from the project results.

**Special thanks to our partners from Germany, the German Society for International Cooperation GIZ, which made this project possible.**

# The project team



**Olexander Yurchak,**
General Director of APPAU and Chairman of TC 185. Roles and functions in the project – general coordination of work, management of ISO 22400 subcommittee, participation in development of relevant white papers, reports and marketing communications.
Email: yurchak.alexandre@appau.org.ua

**Vasyl Myronenko,**
Technical Director of CTS Group Ltd. Roles and functions in the project – project manager, coordination of actions, information, communication in the project, task control, formalization of relations with project experts, communication with the donor, preparation and reporting to GIZ.
Email: vasyl.myr@gmail.com

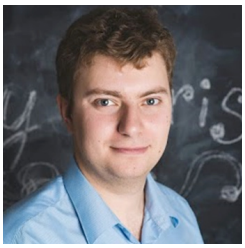
**Olexander Pupena,**
Candidate of Technical Sciences, Associate Professor, Department of Automation and Computer Technology of Control Systems, National University of Food Technologies (NUFT). Roles and functions in the project – coordination in subcommittees IEC-61512 and IEC-62264 on technical issues, management development of white papers and manuals.
Email: pupena_san@ukr.net

**Evgeniy Babeshko,**
Candidate of Technical Sciences, Associate Professor, National Aerospace University «Kharkiv Aviation Institute» (NAU «KhAI»), chairman of the subcommittee on functional safety TC 185, expert of Kharkiv Regional Center «Industry 4.0». Roles and functions in the project – management of the subcommittee IEC 61508 and participation in the work of the subcommittee IEC 62443: development of translations into Ukrainian of standards IEC 62443-2-1, IEC 61508-1, IEC 61508-4, creation of white paper and manuals on functional safety and cyber security.
Email: e.babeshko@csn.khai.edu

**Oleg Ilyashenko,**
Candidate of Technical Sciences, Associate Professor, National Aerospace University «Kharkiv Aviation Institute» (NAU «KhAI»), chairman of subcommittee on cyber security TC185, expert of Kharkiv Regional Center «Industry 4.0». Roles and functions in the project – leadership of the subcommittee IEC 62443 and participation in the work of the subcommittee IEC 61508: translation of standards IEC 62443-2-1, IEC 61508-1, IEC 61508-4, development of white papers and manuals.
Email: o.illiashenko@khai.edu

**Marina Gachkovska,**
Candidate of Technical Sciences, Senior Lecturer of the Department of Automation and Robotics Systems, National University of Life and Environmental Sciences of Ukraine and Executive Secretary of TC 185. Roles and functions in the project – organization of the works of TC 185, management of technical and administrative functions of the secretariat, coordination of works with SE «UkrNDNC».
Email: sm.nuft@gmail.com

# The project team



**Oleg Klimenko,**
Candidate of Technical Sciences, Associate Professor, Department of Automation and Computer Technology of Control Systems, National University of Food Technologies (NUFT). Roles and functions in the project – organizational issues, reporting, participation in the work of the subcommittee IEC-62264, participation in the development of white papers and manuals, technical translation.
Email: frank._.s@ukr.net

**Roman Mirkevich,**
Associate Professor, Department of Automation and Computer Technology of Control Systems, National University of Food Technologies (NUFT). Roles and functions in the project – participation in the work of the subcommittee IEC-61512, participation in the development of white papers and manuals, in technical translations IEC-61512, search for sources of information.
Email: roman.mirkevich@gmail.com

**Alena Shishak,**
PhD student at National University of Food Technologies (NUFT). Roles and functions in the project – participation in the work of the subcommittee IEC-62264, participation in the development of white papers, technical translation IEC-62264, work with the glossary.
Email: al_sh_94@ukr.net

**Olexander Stepanets,**
Associate professor of the department of automation of heat and power processes, National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute». Roles and functions in the project – expert of ISO 22400 subcommittee, participation in translation of white papers standard, analytical and educational materials.
Email: o.stepanets@kpi.ua

**Olena Nekrashevich,**
Senior lecturer of the department of automation of heat and power processes, National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute» and member of TC 185. Roles and functions in the project – expert of ISO 22400 subcommittee, participation in translation of two parts of the standard, development of appropriate white papers, manuals, reports and their technical editing.
Email: olena.nekrashevych@gmail.com

**Lesia Sobolevska,**
Assistant of the department of automation of technological processes, Kyiv National University of Construction and Architecture. Roles and functions in the project – monitoring of problems arising in the project; interrogations and the analytical report on motivation of experts.
Email: sobolevska@atp.in.ua


QUALITY

# WHAT'S FARTHER AWAY?

Our project is over. The development plans for the 185th Technical Committee will be discussed at the next committee meetings in March. They include:

**01 NEW STANDARDS**

New standards to be adopted. Candidates include Smart City, Functional Safety (IEC 61511), other technical standards in industrial automation and IT.

**02 FINANCING**

Financing of TC 185 – how to attract end customers to these issues.

**03 INTEGRATION**

Integration into Industry 4.0 and Digital Agenda of Ukraine.

## TC 185 invites to cooperation Ukrainian enterprises, leading developers, integrators, vendors and technical universities

| TC | 185 |
|---|---|
| INDUSTRIAL AUTOMATION | |

«Association of Industrial Automation Enterprises Ukraine»
Kyiv, 42a/1 Chervonotkatska St.
info@appau.org.ua
tk185.appau.org.ua