



## **2019 Activity Report**

The phase of creating the International Research & Innovation Centre on Intelligent Digital Systems, gathering Institut National d'Etudes Appliquées (INSA) Lyon (France), Universität Passau (Germany) and Università degli Studi di Milano (Italy) is over. 2019 was therefore dedicated to consolidate the network. The goal was to **extend not only academic but also industry collaborations** while at the same time continuing to **increase the quality** of all IRIXYS activities and consolidate the success of the International Research & Innovation Centre, so that it contributes to the current regional, national and international **developments in our field of expertise**.

The purpose of this document is to report on all activities undertaken in 2019 by IRIXYS so as to assess to which extent this ambition has been fulfilled. It reflects well that IRIXYS goals for 2019 have been fully met. We maintained our regular activities and ensured an improved quality in our young scientists' workshops in Lyon (June 2019) and in Passau (December 2019). Some of our top-quality PhD students obtained their Doctor title and our Double master students benefitted from a new weekly intercultural course on "working as IT specialist in French, Germany, Bavaria" geared on stepping up their professional skills. The third French-German Summerschool on AI with industry took place in Passau and Neuburg-am-Inn and met the expectations from its 80 participants from research, industry and policy who came to exchange on the latest innovations and trends in transfer learning. And we maintained and improved our communication activities and reactivity, so as to ensure our work is better known.

But we also developed IRIXYS further. In 2019, we formally welcomed a new associate partner (University of Pau, France), whose students and professors took part in our activities. Our Erasmus+ Strategic Partnership project on Future IT Leaders for a Digital Multicultural Europe FIT Europe (including IRIXYS higher-education institutions and Polytechnico Bucharest, Romania) was successfully selected for funding by the European Commission and was launched. Our collaboration with industry was reinforced. And IRIXYS took part in the latest regional, national and international policy developments in France and in Germany in relation to the development of Artificial Intelligence and the societal, scientific and economic questions and opportunities this new field raises.

# CONTENT

<b>1. Academic Collaborations.....</b>	<b>4</b>
▪ 1.1 Consolidation of our academic collaboration.....	4
• IRIXYS PhD track .....	4
• IRIXYS Young Scientists’ Summer Workshop (Lyon).....	6
• IRIXYS Young Scientists’ Winter Workshop (Passau).....	7
• Scientific results.....	8
• Scientific awards.....	9
• Promotion of our academic collaboration .....	9
▪ 1.2 Extension of our academic collaborations.....	10
• Finalisation of the integration of Pau University.....	10
• Double-Master Uni Passau / ENSIIE Paris.....	10
• Further cooperation with ENS Paris Saclay .....	11
<b>2. Industry and Policy Collaborations .....</b>	<b>12</b>
▪ 2.1 Consolidation of our industry and policy collaboration.....	12
• Vivatech Innovation Fair 2019.....	12
• Summerschool on AI with Industry 2019 .....	14
• IRIXYS Double-master students visit ATOS and SIEMENS AI Lab .....	16
▪ 2.2 Extension of our industry and policy collaboration.....	17
• Visit to Lyon Ecosystem .....	17
• Kick of Fit Europe Project .....	18
<b>3. Other Developments.....</b>	<b>19</b>
▪ 3.1 Connection with other events.....	19
• French-Bavarian Start-ups Night .....	19
• French-German University Economic Forum .....	19
• French-German University Experts’s Meeting on Digital Transformation in France and in Germany.....	20
▪ 3.2 Communication and Governance.....	21
• IRIXYS Advisory Board .....	21
• IRIXYS website .....	21

## 1. Academic Collaborations

### ■ 1.1 Consolidation of our academic collaboration

#### ✚ IRIXYS PhD track

The “IRIXYS PhD track” was conceived to stimulate a bi-national academic postgraduate path: from the start of a Masters to achieving a PhD. In 2019, many students have either undertaken a double Master, or a PhD under French-German or French-Italian double supervision in the frame of IRIXYS.

For instance, in 2019, 10 students from INSA Lyon and from Passau University completed their Masters in Passau (see photo); the group included a good French-German mix of students originally coming from Passau or from INSA Lyon, stimulating intercultural exchanges among this group. One researcher at Passau University took the initiative of creating a separate research project, just for this group of students. In addition, an intercultural extra-course has been provided for several years to this group of Double-Master students; in 2019, the course was revamped, and geared towards the employment market and aimed at providing specific support on intercultural issues raised by the situation of “working as an IT specialist, in France, Germany or Bavaria”. This course proved to be particularly appreciated by the students: *“You have managed through this course to forge a group, including through the various visits and side-offers you gave us.”* highlighted one of the double-Master students in the feed-back they gave after the course.



In 2019, Armin Gerl, Yvan Lucas and Johannes Jugorvsky obtained very successfully their doctor title, following their PhD under double supervision between INSA Lyon and Passau University („co-tutelle“). In addition, Victor Charpenay – former double-Master student between INSA Lyon and Uni Passau - also successfully obtained his PhD at the University of Passau, together with SIEMENS.





## IRIXYS Young Scientists' Summer Workshop (Lyon)

17-21/06/2019

The IRIXYS Young Scientists' Workshop took place at INSA Lyon in a very warm atmosphere and around a dense scientific programme in which more than 30 participants from INSA Lyon, Passau University, Pau University and Milan University took part. This workshop gave the possibility to PhD students from INSA Lyon, Passau University, Milan University and Pau University to share their latest findings and exchange together with other young scientists, professors and senior researchers from the three IRIXYS countries. More than 20 very specific research focuses were dealt with, from "Proof-of-Reputation based Consensus in Privacy and Security in Blockchain", to "Using Convolutional Neural Networks for Credit Card Fraud Detection" or "Data Gathering and Management in a Connected Environment". In the frame of the workshop, a PhD final presentation ("soutenance") from an INSA Lyon PhD student took place, giving the possibility to current PhD students to witness how this important final stage takes place. The workshop was also the occasion for many to discover the LIRIS Laboratory at INSA Lyon and exchange with its scientists.

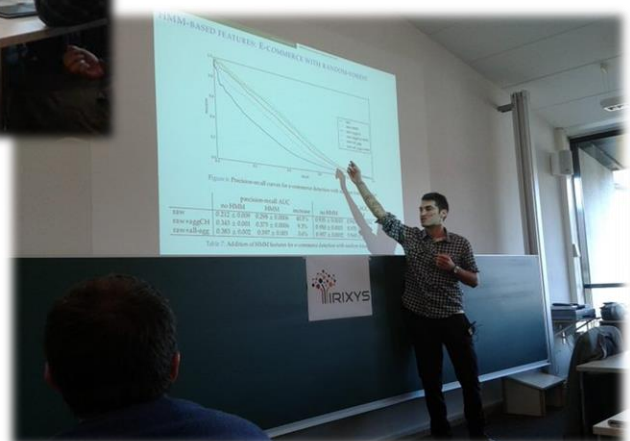


## IRIXYS Young Scientists' Winter Workshop (Passau)

2-6/12/2019

The IRIXYS young scientists' workshop took place from 2nd to 6th December 2019 at Passau University and was certainly atypical, as it welcomed in its frame the final presentations of no less than three IRIXYS PhD students in French-German co-supervision („co-tutelle“, supported by UFA-DFH). With Johannes Jurgovsky, Yvan Lucas and Armin Gerl getting their double (French and German) Doctor titles, IRIXYS celebrated the successful outputs of several years of close, productive and rich trans-national academic cooperation around these 3 students. This did not prevent the workshop to also give the usual possibility to young and senior scientists to present and share their work: more than 15 of them presented their work and initiated discussions on very varied topics like „the Architecture of a Democratic Decision-Making for Distributed Systems Based on a Honey Bee Inspired Algorithm“, „Privacy and Security in a B2B environment: Focus on Supplier Impersonation Fraud Detection using Data Analysis“ or „An Extensible Platform Supporting Assisted Classification Of Large Document Datasets“.

The workshop also opened up to the wider business environment in Bavaria through a dedicated session on “double research degrees in computer science: an added-value in an international IT economy?”. In this frame, exchanges took place with Hervé Martin, Scientific Adviser of the French Consulate in Bavaria, Emanuel Berndt from the company OneLogic, and Barbara Zacharias, Head of Passau University International Office, who each put a specific light on how PhD students can value their experience on the digital global market. Finally, an internal reflection on how to progress further with our future young scientists' workshops took place to support the next IRIXYS activities for our young scientists.

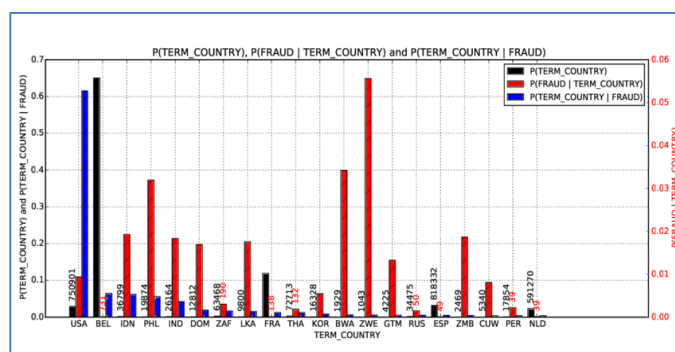


## Scientific results

In 2019, our IRIXYS researchers kept on publishing a **plethora of new results** in various famous international conferences, journals and books. This report will not list all these publications but only mention two examples of our research.

As a first example, two PhD students in French-German co-tutelle have completed and published the final results of various approaches they have followed to support credit card fraud detection. Credit card fraud has emerged as a major problem in the electronic payment sector. Our researchers studied data-driven fraud detection and addressed several of its challenges by means of various methods with the goal to identify fraudulent transactions (that have been issued illegitimately on behalf of the rightful card owner). Multi-perspective automated techniques were designed to incorporate additional sequential information in the transactions feature sets. As a result, these techniques may complement and possibly supplement the use of traditional transaction aggregation strategies and hence improve fraud detection.

As a second example, another PhD student in French-German co-tutelle completed his work in 2019 on data preservation. He managed to model a privacy language and efficient de-identification techniques to support the respect for data privacy. The processing of personal information is omnipresent in our data-driven society and is regulated by privacy policies. Although privacy policies are strictly defined by the General Data Protection Regulation (GDPR), no systematic mechanism is in place to enforce them; it is particularly challenging to ensure compliance to all privacy requirements when data is merged from several sources with different privacy policies. The risk for negligent or malicious processing of personal data is high in such case. The conducted research has therefore enabled to propose a solution to this problem by designing a Layered Privacy Language (LPL) allowing to specify legal privacy policies and privacy-preserving de-identification methods.





## Scientific awards

01/2019

In January 2019, IRIXYS Double-Master student Mathieu Gaillard received Award of Excellence of the French-German University for his excellent academic results and his work on perceptual hashing using convolutional neural networks for large-scale reverse image search.



## Promotion of our academic collaboration

Hamburg, 12-14/6/2019

IRIXYS representatives took part in the General Assembly of the French-German University (DFH-UFA) in Hamburg in June 2019. It was the occasion to meet other higher-education institution representatives active on the French-German cooperation, including on artificial intelligence and big data and discuss with policy representatives from the French-German University, including Philippe Greciano, elected Vice-President by the Assembly on this occasion.



Strasbourg, 12-14/6/2019

IRIXYS participated in the Forum franco-allemand in Strasbourg, in the frame of which the IRIXYS PhD track between INSA Lyon and Passau University raised a lot of participants' interest.



## ▪ 1.2 Extension of our academic collaborations

### ✚ Finalisation of the integration of Pau University

After 2 years of administrative discussions, the partnership agreement was finally signed in 2019 between the IRIXYS founder universities and the University of Pau so as to establish a collaboration around the scientific topics of Big Data Analytics and Semantics, Event Detection, Data Privacy and Collaborative distributed systems (e.g., clouds, peer to peer applications, cyber-physical systems, social mobile applications, Internet of Things). Consequently, Young scientists and senior researchers from the University of Pau actively took part in the Workshop organised in Lyon in June 2019.



### ✚ Double-Master Uni Passau / ENSIIE Paris

A Double Master degree was signed in 2019 between the University of Passau and Ecole Nationale Supérieure d'Informatique pour l'Industrie et l'Entreprise ENSIIE. The signature was prepared by Harald Kosch (Vice-President at the University of Passau) and ENSIIE Director Laurent Prével in May in Paris, and formally took place in Passau between Prof. Dr. Carola Jungwirth (Passau University President) and Laurent Prével in June. Alban Thaumur, the first student taking part in this new Double Master, immediately started in the Summer Semester at Passau University.



### Further cooperation with ENS Paris Saclay

On the occasion of the Summerschool on Transfer Learning organised in Passau in June 2019, the President of Ecole Normale Supérieure Paris Saclay Pierre-Paul Zalio visited the University of Passau. This visit, together with the Summer-School are one step further in the smooth cooperation between both institutions. ENS Paris-Saclay Vice-President Teikaro Nakatani also took part in the visit.





## 2. Industry and Policy Collaborations

### ■ 2.1 Consolidation of our industry and policy collaboration

#### ✚ Vivatech Innovation Fair 2019

16-18/05/2019

For the second time, IRIXYS was represented by the INSA Lyon and the University of Passau on the Viva Technology exhibition (VivaTech), the world's high technology fair for industry actors, start-ups and innovation leaders, taking place in Paris every year, with more than 120.000 visitors: There, IRIXYS shared a common exhibition space with academic and industrial partners on the French-German stand.



*"I am pleased to open the French-German Hub on 4.0 Industry in Vivatech Paris, because such French-German cooperation is for us crucial"* said German Minister for Digitalisation Dorothea Bär when opening the Hub presenting the partnership of Passau University with INSA Lyon Ingenieur School at Vivatech Paris, together with two other similar academic collaborations. *"I met my French counterpart this morning, and I can tell you we both are committed to continue achieving a lot together in the field of digitalisation"* added the Minister.



8 French and German excellent universities, engineering schools and institutions (Institut Mines-Télécom, Technische Universität München, ENSAM, KIT, INSA Lyon, Universität Passau, the Franco-German University and the Franco-German Chamber of Commerce and Industry) supported this initiative dedicated to academic and industrial between Germany and France.

IRIXYS was joined by a set of start-ups having connections with INSA Lyon or the University of Passau. It was the occasion for IRIXYS and the start-ups to make them known not only to the public, but also to industry and major policy leaders. On this occasion, a bilateral discussion took place with Dorothea Bär, German Minister for Digitalisation, as well as with Cédric O (French Minister for Digitalisation), and Nathalie Loiseau,

(French Minister for European Affairs). EU Commissioner Pierre Moscovici, and German Ambassador in France, Nikolaus Meyer-Landrut also visited the stand.

Very enthusiastic, Ambassador Meyer-Landrut expressed his satisfaction that *“such joint French-German work relies on solid institutions. This cooperation reveals that there are strong projects for tomorrow’s Europe. Thanks to these partnerships, we can be optimistic for the future.”*



Ambassador Nikolaus Mayer-Landrut



IRIXYS with Cédric O (French Minister for Digitalisation) and Nathalie Loiseau (French Minister for European Affairs)



German Minister for Digitalisation Dorothea Bär with IRIXYS



## Summerschool on AI with Industry 2019

3-6/6/2019

A Summer School not only for academia but also open to industry and public players, this was the ambition of the French-German IRIXYS Summer School organised by the University of Passau, in cooperation with Ecole Normale Supérieure Paris-Saclay and their partners (in particular BayFrance, Atos, Wordline, Siemens) in June 2019 in Passau and Neuburg-am-Inn. The topic of this Summer School was Transfer learning, a specific aspect of artificial intelligence also related to data science and digital intelligent systems.



With more than half of the 80 participants coming from French and German industries – including SNCF, Michelin, Bertin IT, ZF, BMW, Luminovo, redlink, SCCH, beside Atos, Wordline and Siemens- but also representatives from public bodies -the Bavarian State Ministry for Science and Art , Paris Région Entreprises, the French Consulate in Bavaria, BayFrance and Invest in Bavaria- this Summer School fully achieved its objective, fulfilling the expectations from the organisers, led by Professor Kosch and his IRIXYS team at Passau University.



Highlighting that “*IRIXYS is one of our success-stories*”, the President of the University of Passau Carola Jungwirth recalled the 3 pillars on which IRIXYS has built its success: “*friendship, complementarity, innovation*”. The 4-day Summer School was a perfect illustration of these pillars and effectively supported the implementation in industry of operational solutions coming from innovative Artificial Intelligence techniques and findings.

Together with industry and public players, participating representatives from academia also expressed their high satisfaction with this Summer School's format. This was reflected in the wide participation from high-quality professors, researchers and PhD students coming from universities not only in Germany and France but also in Belgium, Austria and even Japan.

*"The Summer School gives the opportunity to touch upon a wide range of scientific challenges" highlighted Professor Kosch, "and the high-quality of PhD talks and Scientific Talks taking place here is an important asset. Researchers present and discuss innovations that may bring a decisive contribution to future industry developments".*





## IRIXYS Double-master students visit ATOS and SIEMENS AI Lab

26/07/2019

A visit was organised for the Double Master Students at the SIEMENS Artificial Innovation Lab in July, where our French and German students had the possibility to discover the AI Lab and discuss on ethical issues together with Dr. Ulli Waltinger, Head of the Lab.



13/12/2019

A similar visit was organised in December, in which the former IRIXYS Double-Master students still living in Germany were invited to join. It gave the possibility to 2 of these students to discover ATOS Business Technology and Innovation Center and exchange with the ATOS research and management staff.



## 2.2 Extension of our industry and policy collaboration

### Visit to Lyon Ecosystem

18-21/09/2019

In the frame of Passau University Alumni Club, the President of Passau University, Vice-President Harald Kosch and a number of Alumni visited Lyon in September 2019. The aim of the visit was not only to meet and discuss further collaboration with INSA Lyon, but also to visit Pole Pixel, Wordline and other industry players from the Lyon region. Juliette Jarry, Vice-President of Region Rhone Alpes had a bilateral discussion with the delegation and highlighted the digital dynamism of the economic players of the region.





## Kick of Fit Europe Project

13-15/10/2019

In October 2019, INSA Lyon, the University of Passau, the University of Milan and Politehnico Bucharest launched a new project, supported by the European Union (Erasmus +). The aim of the “Fit Europe” project is to train “Future IT Leaders for a Multicultural Digital Europe”.

The originality of this project lies in the fact that this is not only carried out by academia, but relies on a strong cooperation with industry instead. In Fit Europe, academia and industry are working hand in hand not only when designing the training programme, but also when implementing it and coaching students. Beside the 4 higher education institutions, private players - the international leaders ATOS and the company Engineering, the Romanian SME CNECT, the French Startups Hub La French Techn One - are full partners in the project.

*“This is a very exciting project. In Fit Europe, we train those who will be IT leaders tomorrow, so that they build the future digital society and are able to meet the new challenges it will raise.”* enthusiastically announced Professor Lionel Brunie, Head of the INSA Lyon Computer Sciences Department.

The project trains students on emerging burning issues, such as: what will be the place of robots in a multi-generational society? How will Big Data be compatible with ethics? What will be the business interest of block chains? How may “Internet of things” respect people’s private lives and trust in IT? What innovations may rise from these new technologies and how will we address the new societal issues they raise?





### 3. Other Developments

#### ■ 3.1 Connection with other events

##### 🇫🇷🇩🇪 French-Bavarian Start-ups Night

*Munich, 15/07/2019*

IRIXYS took part in the French-German Start-ups Night organised in Institut Francais by ATOS, Bayfrance, Invest in Bavaria and other players. The occasion to discover 15 French and German dynamic start ups engaged for sustainable digital solutions for our planet.



##### 🇫🇷🇩🇪 French-German University Economic Forum

*Frankfurt, 18/11/2019*

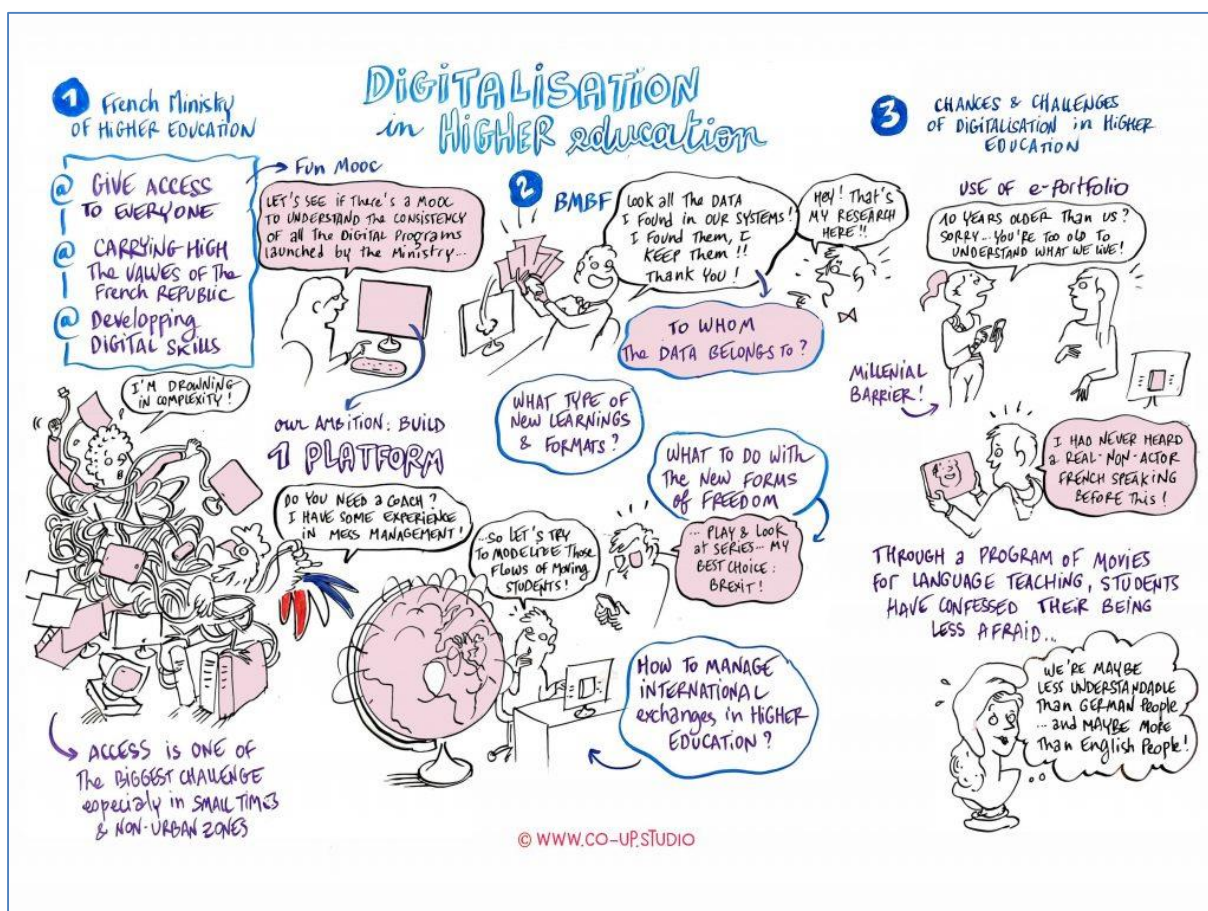
IRIXYS was invited to deliver a contribution in the panel discussions dedicated to future skills for tomorrow's employment market in the frame of the French-German University Economic Dialogue, this year in Frankfurt. It was the occasion to stress how IRIXYS provides our double Master students with innovative content and forms of education, so that each of our student becomes both a French and German IT specialist.



## French-German University Experts's Meeting on Digital Transformation in France and in Germany

Paris, 25/10/2019

IRIXYS contributed actively in the experts' meeting aimed at reflecting on digital transformation in France and in Germany. Several questions were on the table and reflections took place on the ethical aspects of digitalisation but also on the future academic paths and structures to ensure that our students are appropriately prepared and have the necessary skills to meet tomorrow's challenges. IRIXYS took part not only as a participant but also moderated some of the sessions.





## ■ 3.2 Communication and Governance

### IRIXYS Advisory Board

*Milan, 22/03/2019*

The second IRIXYS advisory board meeting took place in Milan in March. The aim was to present IRIXYS activities and get guidance for future plans. In particular cooperation with industries and the possibility for European University cooperation were discussed. Participants included Lionel Brunie, Nadia Bennani, Marie-Christine Baietto (from INSA Lyon), Harald Kosch, Morwenna Joubin (from Passau University), Ernesto Damiani, Gabriele Gianini, Stelvio Cimato, Goffredo Haus, Antonella Baldi (from Milan University), Lothar Schilling from the French-German University, as well as representatives from the company Engineering (Ingegneria Informatica S.P.A.) and of Telecom Italia.



### IRIXYS website

Work has started in 2019 to improve the IRIXYS website. The option chosen was to opt for a modified website, with a reformed technical structure and improved visuals. This work was continued in 2020.