



SARAS CALL h2020-ICT-2016-2017  
 INFORMATION AND COMMUNICATION TECHNOLOGIES

**SARAS**  
 "Smart Autonomous Robotic Assistant Surgeon"

**D8.2 -Plan for Exploitation and Dissemination (Y1)**

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PU = Public, fully open, e.g. web	✓
CO = Confidential, restricted under conditions set out in Model Grant Agreement	
CI = Classified, information as referred to in Commission Decision 2001/844/EC.	
Int = Internal Working Document	

## **D8.2 –Plan for Exploitation and Dissemination (Y1)**

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## List of acronyms

CEB	Common Exploitation Booster
CM	Communication Manager
D8.1	D8.1_PlanForCommunicationActions
HP	Home Page
IAB	Industrial Advisory Boards
IDM	Innovation & Dissemination Manager
IDS	Innovation Disclosure Process
KER	Key Exploitable Results
LSM	Lean Startup Methodology
PMT	Project Management Team
TTO	University Technology Transfer Offices
WP	Work package

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## Executive Summary

SARAS - Smart Autonomous Robotic Assistant Surgeon – The Project aims at developing the next-generation of cognitive autonomous system for solo surgery that will allow a single surgeon to execute Robotic Minimally Invasive Surgery (R-MIS) without the need of an expert assistant surgeon. The project has received funding from the European Union's Horizon 2020, the biggest EU research and innovation programme ever. Horizon 2020 is a Research and Innovation programme aiming at fostering competitiveness and growth and increasing benefits to the European Union's economy and citizens. Public investment in projects is to be converted into socio-economic benefits for the wider society, as clearly indicated in the Horizon 2020 Rules for Participation<sup>1</sup>, with a clear stress on the beneficiaries' obligations to exploit and disseminate the outcomes of the funded activities.

The Plan for the Exploitation and Dissemination of Results is a document which summarizes the beneficiaries' strategy and concrete actions related to the protection, dissemination and exploitation of the project results.

### 1.1 *The structure of the document*

The document is structured into three parts, a generic chapter on Dissemination & Exploitation and two specific ones on SARAS' Dissemination and Exploitation.

Part one starts with a short description of what Dissemination and Exploitation are, with a particular note about their importance in the Horizon 2020 Programme, their objectives and Partner responsibilities.

The second part is specifically devoted to SARAS' Dissemination and describes the process adopted to promote the project's results and how all partners can contribute to promote them, as well as the strategy to make them available to a scientific audience, the specific objectives and proper media mix to reach the goals.

Part three has the same structure of part two, but is related to SARAS' Exploitation. The strategy section includes audience definition, objectives and the media mix deemed ideal to raise awareness among potential commercial partners. Here the plan section includes two possible approaches describing how the IDM can help partners write individual plans and create a global one by month 24/36.

In the Annex an overview of the report of Year 1 Communication Plan can be found, with the main actions conducted so far. A Year 1 Dissemination Report concludes, with a list of all the activities run during the first year.

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<sup>1</sup> [http://ec.europa.eu/research/participants/data/ref/h2020/legal\\_basis/rules\\_participation/h2020-rules-participation\\_en.pdf](http://ec.europa.eu/research/participants/data/ref/h2020/legal_basis/rules_participation/h2020-rules-participation_en.pdf)

## DISSEMINATION & EXPLOITATION

### 1.2 Description

The terms “exploitation” and “dissemination” are defined under the Horizon 2020 Rules for Participation<sup>2</sup> as follows:

- Dissemination - “is the public disclosure of the results by any appropriate means (other than resulting from protecting or exploiting the results), including by scientific publications in any medium”;
- Exploitation - “means the use of results in further research activities other than those covered by the action concerned, or in developing, creating and marketing a product or process, or in creating and providing a service, or in standardization activities”.

All Dissemination and Exploitation activities are part of Work Package (WP) 8, entitled Communication and exploitation, starting month 1, ending month 36. This WP aims at: organizing the envisaged communication activities; monitoring the progress of the dissemination activities; defining the exploitation strategy of the project’s results.

This WP is led by OSR (Ospedale San Raffaele). In particular, SARAS has appointed a Communication Manager (CM) responsible for writing the project’s Communication and Dissemination Plans and carrying them out throughout the project’s lifetime, plus drafting the Exploitation plan to help exploit the project's results through the official SARAS’ media.

An Innovation and Dissemination Manager (IDM), Stefano Fabrizio Grassi, chair of and supported by the Industrial Advisory Boards (IAB), as well as member of the Project Management Team (PMT), has been appointed with the objective of successfully exploiting, developing and promoting innovations based on the project outputs, finding the best way for initiating the technological transfer required for business implementation<sup>3</sup>.

The Industrial Advisory Board (IAB), whose task is to advise on quality of project results, broader societal views, and their practical applicability; on dissemination, implementation and exploitation of results, is comprised of the chair, an industrial experts, Dr. Matthias Peterhans - CAScination, and a representatives of the academic community, Prof. George Mylonas.

All SARAS Consortium members will have to perform dedicated dissemination activities at country level and abroad. All partners will also leverage their country networks and contacts for exploitation purposes.

### 1.3 Objectives

The *Dissemination & Exploitation Plan* will be implemented to provide information, receive feedback and engage in a dialogue the relevant stakeholders involved in the project’s activities. The final goal is for SARAS’ platforms to be widely known and hopefully adopted by European hospitals. For other target groups<sup>4</sup>, identified in deliverable D 8.1 – Plan for Communication actions, the goal consists in creating interest in the system solution.

Communication activities are mainly meant to raise the interest of and engage different stakeholders. Preliminary activities are aimed to identify the key messages, ambitions, objectives, concepts and

<sup>2</sup> <https://www.iprhelpdesk.eu/glossary>

<sup>3</sup> See Grant Agreement-779813-SARAS PART B page 40-47

<sup>4</sup> General Public, Healthcare Experts, Researchers, European companies

goals of the project and to prepare general materials, such as the official website, press releases and news, a project blog, videos and posts on social media, posters and presentations.

Results Dissemination is a peer-based communication taking place the academic world, mainly from researchers to researchers, and consists in providing the main technical outcomes, such as data, achievements and conclusions. These are spread through publications, articles and papers posted on the official website, journals and books or presentations and posters presented at conferences.

Exploitation activities aim to foster market awareness, to offer a product or a solution to end-users or companies, leveraging the effects generated by the communication and dissemination activities. Exploitation consists in the commercialization of the outcomes together or through industrial or commercial partners. To this purpose all the media previously mentioned in the Communication and Dissemination plans are used, with in addition exhibitions, fairs, open innovation communities, networking, call for ideas events and business angels.

Here follows (see Figure 1) a scheme that graphically explains the differences between Communication, Dissemination and Exploitation, highlighting objectives, audiences, contents and media:

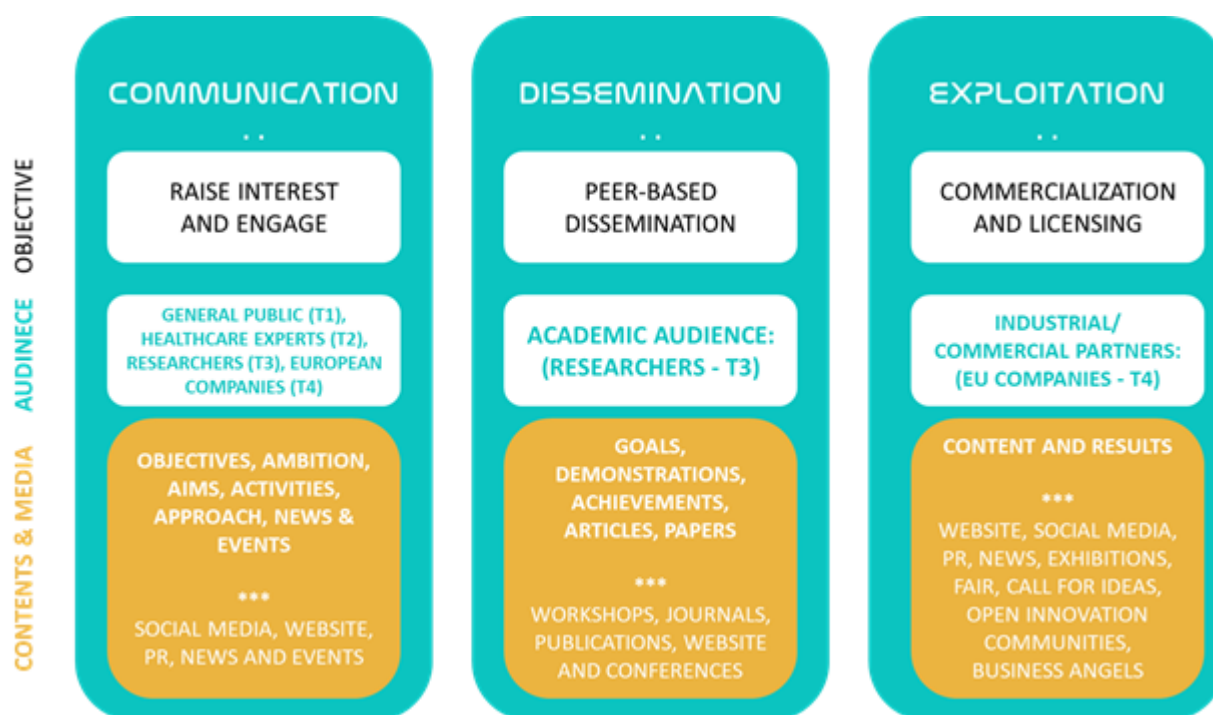


Figure 1 - Communication - Dissemination - Exploitation differences

### 1.4 Partners' responsibilities

All SARAS' partners must contribute to disseminate and exploit the results of the project.

In detail, each partner will be responsible for:

1. Preparing its own Dissemination & Exploitation plan;
2. Informing and sending to the Communication Manager any activity developed within the framework of the project, related details and necessary information. Some example are:
  - a. posters, presentations, demos presented in conferences, seminars or workshops;

- b. papers/articles/proceedings published;
- c. events/workshops and lectures invitation/participation and organization;
3. Keeping a fluid communication with the CM through the Excel file named “Dissemination\_Calendar-xx” (see Figure 3), shared by email and always available for all partners on the project cloud repository;
4. Adding the project’s logo and EU emblem<sup>5</sup> in all dissemination and exploitation materials.

The CM, on their part, will be in charge of:

1. Collecting all Publications and uploading them on the SARAS website, plus adding them on the ZENODO platform if the PDF has been provided and they are Open Access;
2. Collecting attendance to conferences and events and publishing all available information, whenever relevant;
3. Informing consortium members about important aspects related with this WP

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<sup>5</sup> High-resolution EU emblems are available here: [https://europa.eu/european-union/about-eu/symbols/flag\\_en](https://europa.eu/european-union/about-eu/symbols/flag_en)



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 779813 (SARAS).

## SARAS' DISSEMINATION

**Dissemination (or publishing)** refers to the public disclosure of results by any appropriate means, except those resulting from protecting or exploiting the results<sup>6</sup>. Dissemination stimulates further research and development, the rationale for IPR, and exploitation use<sup>7</sup>.

Scientific publications, general information on web sites, participation in conferences are all examples of dissemination activities.

'Dissemination plan' refers to the process of making the results of a research project available to a scientific audience. Dissemination is essential for taking-up crucial elements for the success of a project and for the sustainability of the related outputs in the long term view.

The main objective of dissemination remains to raise awareness among researchers.

### 1.1 Dissemination process

If the project generates outcomes the next step is to write up a report that describes the experiment, the results and the research ideas. Any scientific paper/conference abstract should be submitted to **the IDM and the entire consortium** by providing title and abstract.

Authors who are proposing the scientific paper/conference abstract should propose a **list of authors/partner participants** from the Project Consortium.

Co-authors choose an appropriate journal or conference to which submit the manuscript. The venue's scope should match what reported, so that the audience will be interested in what written.

The submitted paper is subject to the editors and the peer reviewers' scrutiny. If deemed of sufficient interest it is then published as article.

At this point Dissemination can start and one of the authors must inform and provide details to the Communication Manager, who is now allowed to disseminate the publication



Figure 2 - Dissemination Process

<sup>6</sup> [http://ec.europa.eu/research/participants/portal/desktop/en/support/reference\\_terms.html](http://ec.europa.eu/research/participants/portal/desktop/en/support/reference_terms.html)

<sup>7</sup> <https://www.iprhelpdesk.eu/sites/default/files/events/04%20Preparing%20Proposals%20and%20Managing%20Projects.pdf>

according to the Communication Strategy laid out in “D8.1\_PlanForCommunicationActions”.

To disseminate publications the CM must be alerted by Partners and provided with all the useful information. To ensure a smooth communication and, whenever possible, to provide information of any dissemination and exploitation activities developed within the framework of the project, as well as to avoid losing information, a procedure has been designed in D8.1, presented to the partners during the first Project Meeting held in Barcelona in September the 25<sup>th</sup>, sent via email and uploaded on the Project Cloud Repository.

The procedure consists in periodically updating an excel file named “DISSEMINATION\_Calendar\_final-xxx” and alerting the CM about changes via email.

Figure 3 - Dissemination Calendar File

The Dissemination Calendar Excel file is quite intuitive and structured into 6 Sheets, labeled as follows:

1. LEGEND: a Sheets description and a Glossary guides Partners filling in the file.
2. PUBLICATIONS-JOURNALS-PAPERS: Insert all information on the Paper required for publication on the website.
  - a. Paper main information: title, date of publishing, authors, the abstract, keywords, editor and so on;
  - b. Type of publication
    - i. BOOK= Book/Chapter
    - ii. PAPER= Proceeding/In proceeding/Conference Paper
    - iii. JOURNAL= Journal/Article
    - iv. THESIS= Master Thesis
  - c. Mandatory: indicate if the publication is Open Access, and if it is provide the complete and final PDF to allow the CM to upload it on Zenodo, differently fill in the DOI/ISBN/ISSN field;

- d. The Column O “Status of Publication” is filled in by the CM to keep track of what has been uploaded and when.
  - e. The third area in orange contains extra information related to the article, such as the Conference Name, the Publisher, the Series or the Volume where it appeared...
3. CONFERENCES: Insert here all Conferences where a Paper/Poster has been presented.
  4. EVENTS: Insert here all Exhibitions, Fair, events mainly addressed to Commercial partners, manufacturers...
  5. WORKSHOPS: Insert here all informative/formative events attended/organized for Pupils, Doctors...
  6. Meetings: Insert meetings of Consortium Partners and Reviewers meetings.

The file is also available in the Project Cloud Repository in the “00.FILE to PUBLISH” folder, whose contents are listed in the following:

- the Dissemination Calendar excel file to fill in (see Figure 4);
- a PDF named “Communication\_Dissemination\_HOWtoContribute”, which the Communication Manager presented at the Barcelona Project Meeting, describing the procedure for Partners to actively contribute maximising the impact of the project and disseminating results;
- a folder named “Publications PDF” where to upload all PDFs of Open Access Papers.

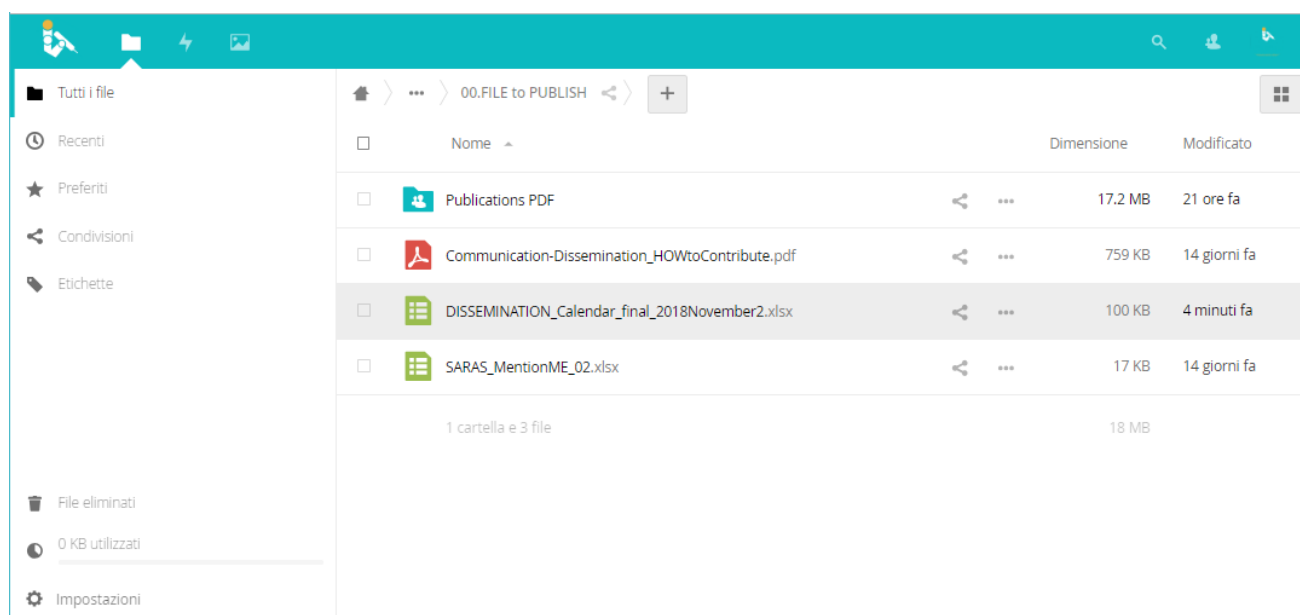


Figure 4 - Cloud Repository Folder FILE to Publish

### 1.2 *Dissemination strategy*

The Dissemination Strategy, included in D8.1 and here summarised, describes how making the results and deliverables of a project available to scientific audience. Such a Strategy is crucial for the success of a project and for the sustainability of its outputs in the long term view. It defines:

- The audience of interest;
- The objective(s) of the dissemination;
- The contents of most interest for the target audience;
- The channels to be used to achieve the target.

#### 1.2.1 Audience

The target audience identified for the dissemination is the researchers' community.

Researchers are all familiar with European grants, research projects and use the very formal academic language; they read papers, journals and technical documents about different topics, as among which **surgical robotics, computer vision, machine learning and artificial intelligence.**

Geographically, they are located both inside and outside Europe, but we will pay particular attention to SARAS Partners' local markets: Italy, Spain, UK, Germany and Austria.

#### 1.2.2 Objective

The Objective of SARAS dissemination is to engage and encourage participation in research, to educate and inspire the next generation of scientists in order to expand the European network of researchers in the field of cognitive robotics and autonomous robots.

#### 1.2.3 Content & Channels

The ideal media mix to get in contact with Researchers and maximize the dissemination effects is a composition of the following channels:

##### 1.2.3.1 SARAS Website

We have created a specific area, reachable from the main menu of the SARAS website, named "Publications" where to place all published output. A special plugin of WordPress named *teachPress* has been installed to easily manage courses, enrollments and publications and keep a similar structure used in other Projects' websites.

**All Publications, book and articles** that, at the discretion of the partners, are notified to the CM will be:

- Added on the website in the "Publications" area
- (if Open Access and with PDF provided) deposited on Zenodo, an Open Access Portal
- (optional) published as a news in the website dedicated area termed "News"
- (optional) added in the "Highlights" area in the Home page of the website
- (optional) posted on social media
- (if presented at an event) inserted in the related event page
- (if a video of the presentation exists) added to the Videos section and to the official channel of the Project on YouTube

Website URL: <http://saras-project.eu/>



### 1.2.3.2 Social Media

- **YouTube:** An official channel for the project “SarasH2020 “has been created (see Figure 5)  
Channel page: <https://www.youtube.com/channel/UCh3x52tiWIs8dsUTbiYNuDw>

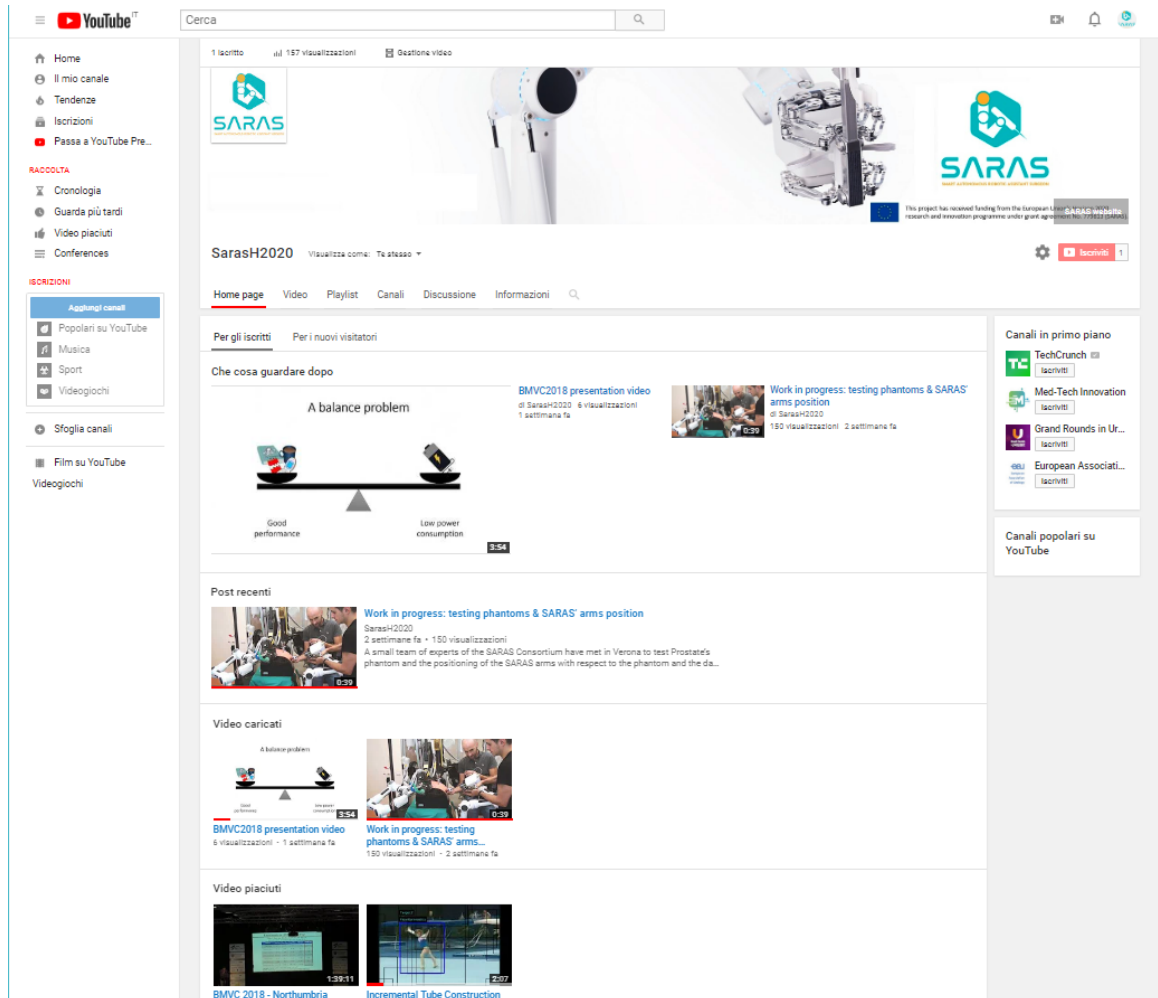


Figure 5 - SARASH2020 YouTube Channel

- **Twitter**  
Twitter is the social media of choice for communicating the results of a research activity, sharing resources, promoting events and publications, building online communities, connecting with people and communicating with followers.  
On Twitter 65% of users are under the age of 34<sup>8</sup>.  
It is mainly exploited to expand one’s audience using links to valuable content and to redirect them to a landing page of the official website.  
Profile page url: <https://twitter.com/SarasH2020>

<sup>8</sup> Statistics on The 2018 Social Audience Guide <https://www.spredfast.com/social-media-tips/social-media-demographics-current> and <https://blog.hootsuite.com/social-media-demographics/>

### 1.2.3.3 Events

Various types of events may be considered depending on audiences, objectives, budget and topics. For Dissemination purposes we consider relevant the following:

1. **Conferences** are the best way to meet peers in person, they can help gaining connections and nurture collaborations; popular in the academic and medical fields.
2. **Workshops and Seminars** are informative/educational events for the demonstration of a product and/or the training of attendees.

### 1.3 *Dissemination Plan*

A plan is a list of detailed activities to conduct in a specific period with a specific purpose. However, since it is simply not possible to identify in the early stages of the research process what results will be generated in what period or whether a paper will be published, we are not going to draft a plan; we will instead present an annual report, that will be progressively and periodically updated (see Appendix B - Dissemination Report)

## SARAS' EXPLOITATION

**Exploitation (or use)** can be commercial or research, and it means to make use of the results produced in the project in further activities other than those covered by the project, e.g. in other research activities; in developing, creating and marketing a product, process or service, in standardization activities<sup>9</sup>.

Appropriate exploitation leads to innovation. It has become a crucial element in H2020 projects, and is therefore a mandatory activity and reporting item.

Exploitation of results can be performed either by single partners directly (e.g. for further research or for commercial or industrial exploitation in its own activities) or by others (other beneficiaries or third parties, e.g. through licensing or by transferring the ownership of results).

### 1.1 Exploitation process

The Exploitation process implies that the project consortia clarify issues, explore solutions and actions for successful exploitation, setting up roadmaps for the sustainability of the project results and creating value out of novel knowledge, such as creating revenues, improving skills, standardization or patenting, finding pathways for future work.

In this complex phase the IDM will support partners finding tools and consultants that may help them draft their own Key Exploitable Results (KER) and draw an individual strategy and plan.

To support Consortia in this phase the Directorate General for Research and Innovation offers on-demand services such as the Common Exploitation Booster (CEB)<sup>10</sup>.

With the help of a consultant each Partner will have the ability to identify the potential innovations stemming from the project, to run a market analysis, to run a KER verification, validation and selection and to draw a Business plan to implement the first steps.

To move forward and maximise the outcomes of the project the Partners which identified one or more valuable KER(s) will then develop for each of them a go-to-market strategy.

The actions drafted in the preliminary plan will be transferred to the IDM and the CM to allow proper divulgation and communication.

Plans are periodically refined, as the key features and possible usage of SARAS implemented



Figure 6 - Exploitation Process

<sup>9</sup> [http://ec.europa.eu/research/participants/portal/desktop/en/support/reference\\_terms.html](http://ec.europa.eu/research/participants/portal/desktop/en/support/reference_terms.html)

<sup>10</sup> <http://exploitation.meta-group.com/Pagine/About-Us.aspx>

innovation become clearer. All valuable results will be included in the exploitation report, following the guidelines defined in the exploitation strategy.

### 1.2 *Exploitation strategy*

The Exploitation Strategy defines the guidelines for communicating the Consortia Business Outputs and defines:

- Audience(s);
- Objectives;
- Type of contents;
- Channels to use.

#### 1.2.1 **Audience**

The Exploitation audience identified is: European companies.

These are manufacturers, investors, OEMS and Solution providers of both macro areas of Robotics and Healthcare; i.e. potential manufacturers of surgical robotic tools and of specific subsystems (software and hardware).

Business description: they mainly operate in the Medical and/or Robotics industry, but also in the Professional service robotics, Artificial Intelligence, Healthcare technology, Industrial robotics, Software & applications, and Internet of things sectors. Some are startups and/or spin-offs.

This cluster groups people that can read and use robotic-related medical terminology and technical jargon but use an informal register.

Geographically, we will be addressing our communication to European Companies, with a particular attention to our Partners' local markets: Italy, Spain, UK, Germany and Austria.

#### 1.2.2 **Objective**

The objective of SARAS' exploitation is to open new markets in the European industrial world of surgical robotics, phantoms design and training, thanks to the enormous potential for SARAS-like systems in Europe.

SARAS pushes human-robot cooperation to a new level and it focusses on one of the key technologies of the Industry 4.0 program.

#### 1.2.3 **Contents & Channels**

The ideal media mix to get in contact with European Companies in the medical-robotic industry is a composition of the following channels:

##### 1.2.3.1 **SARAS Website**

Several areas in the website are designed to be useful for the industry:

- The home page (HP) has been structured to provide all immediate information to understand what the project aim is, for example in the *Saras at a Glance* section; scrolling down the HP we find the *News* section that contains the most relevant updates on the project, such as progress, results, and blog posts; the *Testimonials* area is also functional to attract potential commercial partners.
- The *Project* area has been specifically design for the industry with its sub-menus describing the project *Objectives, Concept and Approach, Ambition and Impact*.

- The *News* area is multifunctional, but since it is written in a journalistic style it facilitates the reading and finding of contents of interest; the page is enriched with a right column all dedicated to contents, where users can find all recent posts from official social medias, the TAG cloud that helps finding specific topics by clicking on terms and the latest news section.
- The *Event* area may help industry participants find and reach us at congress, exhibitions and other international events.

Website Page: <http://saras-project.eu/>

### 1.2.3.2 Social Media

- **LinkedIn** is the world's largest professional social media network. The majority of LinkedIn users are over 30, have a higher education degree and a senior-level job position (influencers, decision makers, and C-level executives). The content that performs best on LinkedIn is content that helps being more efficient or industry-specific content. It is ideal for salespeople to connect with prospects and for marketers to run Lead generation campaigns. By posing questions, publishing useful content and answering others' questions, the project can foster a cohort of followers and build up an expertise status. LinkedIn Groups are especially useful to this extent.

LinkedIn SARASH2020 page (see Figure 7): <https://www.linkedin.com/company/sarash2020>

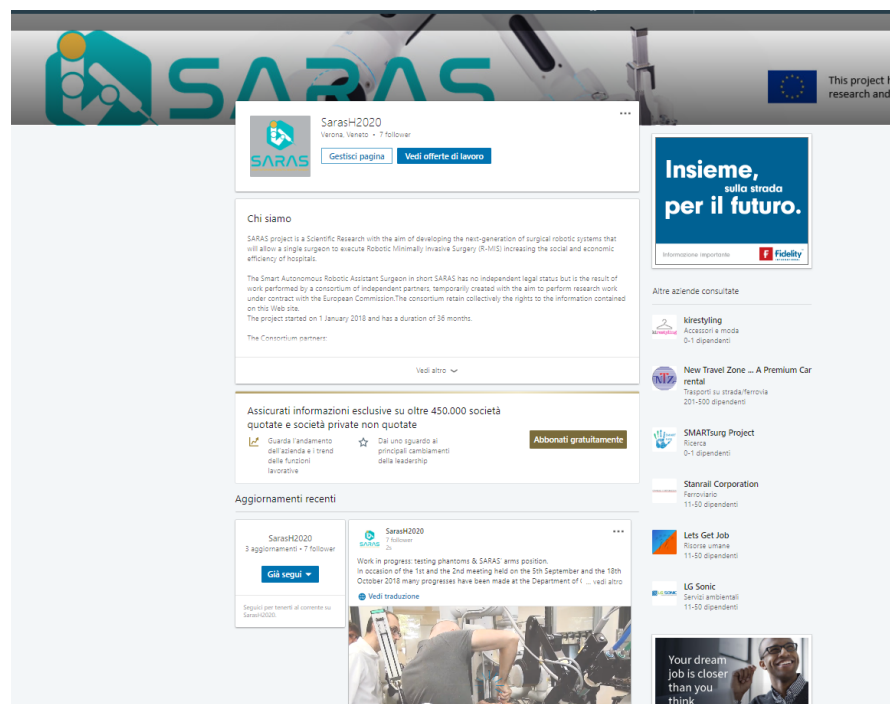


Figure 7 - SARAS' LinkedIn Page

#### ○ **Twitter**

Twitter is also good to gain visibility in the industry sectors related to SARAS. As previously seen for researchers, valuable contents have the potential to direct the audience to the proper page of the website.

### 1.2.3.3 PR & News

All news, press releases and announcements about the project will sit in the blog area named “News”. In terms of contents and topics this area is quite heterogeneous.

### 1.2.3.4 Events

We have seen that there are various types of events depending on audiences, objectives, budget and topics. Those ideal for Exploitation are:

- **Exhibitions and trade fairs:** these are business events particularly relevant for industry related topics, where companies showcase new products, technologies or present services.
- **Technology transfer center:** SARAS’ non-academic partners (MEDIN and ACMIT), will exploit their network, with the aim of expanding the number of companies interested in the project’s outcomes.
- **Workshops** involving industrial players to spread the knowledge of SARAS’ cooperative technologies. UNIMORE, UNIFE, OBU and UNIVR have links with local and regional industrial associations, which will allow contacting a number of companies interested in cooperative robotics.
- **Networking & inbound marketing** focuses on relationships with prospective customers and heavily relies on building networks with them. The aim of inbound is to create content such as e-books, newsletters and blogs that triggers the target to interact with the itself. Inbound marketing, however is time-consuming, and requires great attention and know-how on the topic of interest: for those reasons, the CM will publish only contents coming from Partners.

### 1.3 *Exploitation Plan*

During the first 12 months of the project, thanks also to the contribution of the Industrial Advisory Board (IAB), some key points were identified with the aim of creating an **Innovation Disclosure Process (IDS)**. This is a way to stimulate socio economic development, transforming knowledge into new products and services for the society and creating successful collaborations between researchers and industries.

The IDS should take into account the following steps:

- Establish regular meetings with the R&D team to analyze technology developments and check if there are inventions which fulfill the patent requirements;
- Do a systematic evaluation of patent ideas through a forms in order to evaluate potential impact and business potential.
- Define who can potentially exploit the patent – internal activities such as Spin-Offs or licensing to a potential commercialization partner;
- Organize a workshop on invention disclosure with the project team.

All of this is of fundamental importance for identifying which results, properly developed, are useful for satisfying market needs. In this perspective, by the end of February 2019, a form will be shared with all partners to highlight the results achieved and to describe their KER.

The form could include the following details:

- The KER description
  - Description of the KER
  - Description of the problems the KER is solving
  - Competitor that is/are now solving the same problem
  - Description of how the KER can be transformed into a product/service
  - Description of how your product/service differ from competitors alternative solutions
  - Description of competitive advantage (Unique Selling Point) and strengths
  - Description of any legal, normative or ethical requirements connected to the development of your product
  - Targetted Market and Customer segments (Product positioning)
  - Early adopters
  - Market Trends
  - Market size for the product/service
  - Top three competitors description

A **Strategic Exploitation session** will be scheduled within the Project Meeting of March 2019 - M15, led by the IDM and involving all SARAS Partners will help the Consortium to maximize the effectiveness of the exploitation effort.

In case of valuable results and a clear KER definition the IAB will support the partners in suggesting activities and tools useful for the definition of their individual exploitation plan and the identification of the most appropriate business model.

**Individual plans**, according to the current partners' core business and expertise, will address the exploitation potential of the specific outcomes produced (and owned) by the individual partners. In the case of the integrated solution which will result from the interaction and integration among the different activities of all SARAS partners a **Global exploitation plan** will be drafted in conjunction. This

joint plan will also take care of identifying target customers, markets, and a possible timeline for the full market outreach.

The results of the exploitation meeting and of all the relevant interactions and analysis, will be the basis for preparing Individual Exploitation Plans - hypothetically by month 24 and a Global Exploitation Plan by month 36.

*Table 1 - Exploitation calendar (draft)*

	<b>ACTIVITY</b>	<b>DESCRIPTION &amp; AIM</b>	<b>TEAM LEADER</b>	<b>TEAM MEMBER</b>
<b>M10</b>	IAB 1 <sup>st</sup> brain storming	Innovation Disclosure Process has been drafted	IDM	IAB
<b>M14</b>	Form definition	The final Invention Disclosure Form will be shared with all partners to help them draft their KERs	IDM	Team Leaders
<b>M15</b>	Strategic Exploitation session	During the Project meeting the IDM will lead a session to discuss the identified KERs	IDM	All partners
<b>M18 (tentative)</b>	Tools definition	The IAB will evaluate tool offered by the EU community (such as the Common Exploitation Booster) to help partners drafting their individual plans.	IDM	All Partners
<b>M24 (tentative)</b>	Individual plans	External expert will coach partners in preparing the lean canvas of their exploitable results	IDM	All partners
<b>M36 (optional)</b>	Global plan	To be evaluated	IDM	All partners



# Appendix A - Communication Report

Here follows a report of the main Communication activities run from the 1<sup>st</sup> of January till the 4<sup>th</sup> of December 2018. Note that:

- Tables are extracted from the Social Content Calendar;
- Figures comes from website and social media activities.

## 1.4 Social content calendar

SARAS PROJECT				FACEBOOK				TWITTER				LinkedIn				
event	TEXT	URL	#	in	SCH	FB post	FB published	TV cat	TV published	TV Time	TV cat	TV published	TV Time	TV cat	TV published	TV Time
event	Application deadline to the 2nd Biannual Summer School on 'Formal of Surgical Education (FOSE) 2018				02-mag											
meeting	Robotics-assisted surgery real Time (ROSE) 2018	<a href="https://www.robotsk.com">https://www.robotsk.com</a>	#ROSE2018		16-mag		3:34 PM									
meeting	Meet in 2018!	<a href="https://www.robotsk.com">https://www.robotsk.com</a>	#ROSE2018 #SARAS2018		07-jul		12:36 PM									
event	ESG-SARAS 2018: European Society for Surgical Robotics (ESG) 2018	<a href="https://www.esg-saras.com">https://www.esg-saras.com</a>	#ESG2018		15-jun		5:27 PM									
collateral	Kind of mission: Find brochure for external use, to present the project at 'Conferences and events'		#ESG2018		16-feb		12:00 AM									
duration					02-mag											
duration					15-jul		10:32 AM									
event	Download the program Endobrochons the 8th World Spine Society (WSS) 2018	<a href="https://www.wss2018.com">https://www.wss2018.com</a>	#WSS2018		15-jul		9:32 AM									
event	Spining soon! 4 days of workshops and conferences with the international experts & technicians	<a href="https://www.wss2018.com">https://www.wss2018.com</a>	#WSS2018		15-jul		8:54 AM									
FIJN	International Women in Engineering Day	<a href="https://www.iwed.org">https://www.iwed.org</a>	#IWed2018		23-jul		8:32 AM									
event	STARTING NOW!	<a href="https://www.iwed.org">https://www.iwed.org</a>	#IWed2018		24-jul		8:32 AM									
event	STARTING NOW!	<a href="https://www.iwed.org">https://www.iwed.org</a>	#IWed2018		05-lug		10:30 AM									
FIJN	The 2nd Summer School on 'Formal of Surgical Education' (FOSE) 2018	<a href="https://www.fose.com">https://www.fose.com</a>	#FOSE2018		12-lug		11:10 AM									
event	Show down, today is the Simple Day! In our last day Extra-Operational (ECCS) Operative, San Raffaele has been invited to present SARAS overview at the				15-lug		5:27 PM									
duration					19-lug		3:42 PM									
duration					07-ago		5:09 PM									
duration	Developing and analyzing procedures in the use of SARAS in minimally-invasive systems. The aim is to improve the quality and economic impact on hospitals and healthcare systems. The aim is to improve the quality and economic impact on hospitals and healthcare systems. The aim is to improve the quality and economic impact on hospitals and healthcare systems.	<a href="https://www.saras-project.eu/">https://www.saras-project.eu/</a>	#SARAS2018		28-ago		9:00 AM									
duration	The 5th September SARAS poster will be presented at the 5th European Society for Surgical Robotics (ESG) 2018	<a href="https://www.esg-saras.com">https://www.esg-saras.com</a>	#ESG2018		31-ago		12:31 PM									
duration	The 5th September SARAS poster will be presented at the 5th European Society for Surgical Robotics (ESG) 2018	<a href="https://www.esg-saras.com">https://www.esg-saras.com</a>	#ESG2018		04-set		12:20 PM									
duration	The 5th September SARAS poster will be presented at the 5th European Society for Surgical Robotics (ESG) 2018	<a href="https://www.esg-saras.com">https://www.esg-saras.com</a>	#ESG2018		10-set		11:30 AM									
duration	The 5th September SARAS poster will be presented at the 5th European Society for Surgical Robotics (ESG) 2018	<a href="https://www.esg-saras.com">https://www.esg-saras.com</a>	#ESG2018		09-nov		10:34 AM									
duration	The 5th September SARAS poster will be presented at the 5th European Society for Surgical Robotics (ESG) 2018	<a href="https://www.esg-saras.com">https://www.esg-saras.com</a>	#ESG2018		13-nov		11:49 AM									
duration	The 5th September SARAS poster will be presented at the 5th European Society for Surgical Robotics (ESG) 2018	<a href="https://www.esg-saras.com">https://www.esg-saras.com</a>	#ESG2018		05-set		11:40 AM									
duration	The 5th September SARAS poster will be presented at the 5th European Society for Surgical Robotics (ESG) 2018	<a href="https://www.esg-saras.com">https://www.esg-saras.com</a>	#ESG2018		22-ott		11:40 AM									
duration	The 5th September SARAS poster will be presented at the 5th European Society for Surgical Robotics (ESG) 2018	<a href="https://www.esg-saras.com">https://www.esg-saras.com</a>	#ESG2018		28-nov											
duration	The 5th September SARAS poster will be presented at the 5th European Society for Surgical Robotics (ESG) 2018	<a href="https://www.esg-saras.com">https://www.esg-saras.com</a>	#ESG2018													

## 1.5 *Web and social media pages*

### 1.5.1 Official Website

<http://saras-project.eu/> (see Figure 8)

The website structure and navigation menu:

- Home Page (HP)
  - Menu area
  - Banner Hero
  - Saras at a Glance
  - Highlights section
  - News section
  - Testimonials
  - SARAS Consortium slider
  - Meet the Team section
- Project
  - Objectives
  - Concept & Approach
  - Ambition
  - Impact
  - Horizon 2020
- Consortium
  - Impressum
  - Work plan
  - Management Structure
  - Meet the Team
- Publications
- News
  - Press review
  - Events
  - Downloads
- Contact

### Project's Objective

SARAS aims at developing the next-generation of surgical robotic systems that will allow a single surgeon to execute Robotic Minimally Invasive Surgery (R-MIS) without the need of an expert assistant surgeon.

[Read more](#)



## SARAS - Smart Autonomous Robotic Assistant Surgeon

### SARAS AT A GLANCE



#### SARAS Technology

SARAS proposes an innovative technological system:

1. Two assistive robotic arms designed to implement the tasks done by the assistant surgeon in R-MIS (Robotic Minimally Invasive Surgery).
2. A cooperative and cognitive supervisor system able to infer the actual state of the surgical procedure from the sensing system and to act accordingly with the surgeon's needs.



#### SARAS platforms

1. MULTIROBOTS-SURGERY: the main surgeon uses a robotic system, the assistant surgeon tele-operates the SARAS assistive robotic arms.
2. SOLO-SURGERY: the system is autonomous and plays the role of the assistant in the R-MIS
3. LAPAROSCOPIC-SURGERY: SARAS system plays the role of the assistant and the main surgeon uses standard laparoscopic tools.



#### SARAS Ambition

SARAS will lead to a new generation of autonomous surgical robots. SARAS will go beyond any existing system for R-MIS, leveraging on a ground-breaking artificial intelligence module.

The aim is to develop a cognitive robotic system capable of autonomously understanding the present and future surgical situation, and performing actions at the right place and time.



#### SARAS Impact

SARAS platform is designed to both complement any existing and future surgical robotic system and to be used alone for traditional laparoscopic operations performed in solo surgery mode.

The aims are to decrease the cost per surgical operation, increase the number of interventions, reduce waiting lists and boost efficiency of Healthcare system across Europe.

Figure 8 - Website Home Page

This screenshot shows the news section of the SARAS website. It features several articles with images and text. The main article is titled 'Work in progress: testing phantoms & SARAS' arms position' and includes an image of a surgical phantom being tested. Other articles include 'THE MULTIROBOTS-SURGERY' with an image of a surgical team, and 'COSUR 18: SOME NUMBERS FROM THE 2ND EDITION' which features a graphic of a city skyline.

Figure 9 - News Section in the Home Page

This screenshot shows the news area of the SARAS website. It includes a search bar at the top, social media links for Facebook and Twitter, and a list of news items. The first item is 'Work in progress: testing phantoms & SARAS' arms position' with an image of a surgical phantom. Below it is 'THE MULTIROBOTS-SURGERY' with an image of a surgical team. The bottom part of the page shows a list of tags and categories related to the news items.

Figure 10 - News area

This screenshot shows a quote from Paolo Morandini, a professor at the University of Verona. The quote discusses the importance of patient safety in robotic surgery and mentions that the SARAS system is designed to ensure safety. The quote is attributed to Paolo Morandini, Professor of Robotics and Automation at the University of Verona.

This screenshot shows the 'Meet The Team' section of the SARAS Consortium website. It features profiles of several team members, including Marco Cazzulani, Fabrice Duret, and Stefano Grassi. Each profile includes a photo and a brief description of their role and expertise. The section also includes logos for the participating universities: Università di Verona, UNIMORE, and Università degli Studi di Ferrara.

Figure 11 - Consortium slider and Meet the Team section in the Home Page

This screenshot shows the SARAS Consortium page, which details the mission and objectives of the consortium. The page is organized into sections for each of the participating universities: Università di Verona, UNIMORE, and Università degli Studi di Ferrara. Each section describes the university's contribution to the consortium and the specific research areas they are focusing on. The page also includes a list of consortium members and their contact information.

Figure 12 - Consortium Page

## D8.2 –Plan for Exploitation and Dissemination (Y1)

The Smart Autonomous Robotic Assistant Surgeon in short SARAS project has no independent legal status but is the result of work performed by a consortium of independent partners, temporarily created with the aim to perform research work under contract with the European Commission. The consortium retain collectively the rights to the information contained on this Web site.

The project started on 1 January 2018 and has a duration of 36 months.

**Project coordinator (legal representative)**

Dr. Riccardo Muradore  
 Department of Computer Science  
 UNIVERSITÀ DEGLI STUDI DI VERONA (UNIVR),  
 established in VIA DELL'ARTIGLIERE, 8  
 VERONA 37129  
 Italy  
 VAT number: IT01541040232,  
 represented for the purposes of signing the Agreement by Franco PUMMI  
 +39 045 802 72 38 (office)  
 Email: riccardo.muradore@univr.it  
 http://www.univr.it/

**Website representative**

Michele Severgnini  
 Center of Advanced Technology in Health and Wellbeing  
 OSPEDALE SAN RAFFAELE SRL (OSR)  
 established in VIA OLGETTINA 60,  
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 Please address your requests for approval to:  
 Dr. Riccardo Muradore  
 Department of Computer Science  
 UNIVERSITÀ DEGLI STUDI DI VERONA (UNIVR),  
 established in VIA DELL'ARTIGLIERE, 8 VERONA 37129 Italy  
 Email: riccardo.muradore@univr.it

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- No alterations may be made to pictorial content, with the exception of framing modifications to emphasize the central motive.
- The source must be quoted and two free reference copies must be sent to the above-mentioned address. Such usage is free of charge.

**General Disclaimer**

Figure 13 - Impressum Page

SARAS workplan is decomposed into four clusters of WorkPackages (WP1-2, WP3-6, WP7 and WP8-9), visible in the Part diagram.

The clusters are the following:

- Surgical knowledge, specification and validation (WP1-2)**, where medical specifications and requirements are settled and translated into engineering specifications.
- System architecture (WP3-6)**, in which the technologies enabling the abilities needed by the SARAS system are developed.
- System integration (WP7)**, here SARAS innovative tools, algorithms, methodologies and hardware are integrated in a seamless way, and validated by surgeons in real-world clinical scenarios.
- Communication/Exploitation (WP8) and Management (WP9)** completes the picture.

**Work package descriptions**

**WP1 Surgical procedure specification and validation**

Objectives

- To define the clinical, technical and safety requirements for radical prostatectomy and partial/complete nephrectomy
- To develop and validate the workflow models for the surgical operations
- To identify the main risks related to the specific tasks and strategies for their mitigation
- To identify the benchmark tests to perform and demonstrate the surgical procedures
- To validate the SARAS system on the synthetic phantom models and on Thiel soft-embalmed human cadaver models

**WP2 Anatomical modelling, artificial and Thiel embalmed human phantoms**

Objectives

- 3D artificial phantom models:
  - To develop anatomically accurate complex 3D virtual reconstructions, as computational models of features of body, organs, bones, vessels and soft tissues
  - To develop anatomically accurate complex 3D synthetic tissue mimicking material (TMM) physical phantoms of features of the body, organs, bones, vessels and soft tissues
  - To develop appropriate anatomical abdomen phantom assemblies for MIS radical prostatectomy and partial/complete nephrectomy based on clinical imaging data with respiratory motion and pulsatile flow in arterial perfusion of organs
- Thiel soft embalmed human cadaver models:
  - To develop artificial free breathing and perfusion models of the abdomen that complies the requirements of testing the SARAS robotic system
  - To develop synthetic abdominal phantom carcasses with artificially perfused explanted porcine organs embedded
  - To develop Thiel soft-embalmed human cadaver models with re-perfused kidney and respiratory motion

Figure 14 - Work Plan - Consortium area

**Management Structure**

SARAS management structure is designed to be lean, flexible and consensual, to ensure that all the consortium members work together as a team to undertake the project. We make a distinction between general project policy and strategic decisions, made at General Assembly (GA) level, and day-to-day operational decisions, which will be the responsibility of the Project Management Team (PMT).

Also, to facilitate the smooth running of the project, a Scientific Officer (SO) assists the Project Coordinator (PC) when it comes to the monitoring of the actual scientific and technological objectives.

The structure

The overall structure is composed by:

- Project Coordinator (PC)
- Scientific Officer (SO)
- General Assembly (GA)
- Project Management Team (PMT)
- Work Package Leaders (WPLs)
- Industrial and an Ethics Advisory Boards
- an Innovation and Dissemination Manager (IDM)

Diagram illustrating the Management Structure:

```

    graph TD
        GA[General Assembly (GA)] --- PC[Project Coordinator (PC)]
        GA --- SO[Scientific Officer (SO)]
        GA --- PMT[Project Management Team (PMT)]
        GA --- WPLs[Work Package Leaders (WPLs)]
        GA --- IAB[Industrial Advisory Board (IAB)]
        GA --- EAB[Ethics Advisory Board (EAB)]
        PMT --- WPLs
        PMT --- SO
        PMT --- IDM[Innovation and Dissemination Manager (IDM)]
    
```

**Roles:**

The **Project Coordinator (PC)** is responsible for the overall general management of the project, including financial and administrative management, liaison with the EC and external advisory boards, internal communications management, performance and quality monitoring, overall risk management, and steering the project in case of any deviations.

The **General Assembly (GA)** is the ultimate decision-making body of the consortium. Its role is to oversee the general management and direction of the project and to advise and decide on policy and strategy. The GA provides a monitoring body for administrative and financial aspects, communication and exploitation activities, technical decisions that may impact the project's objectives or in case the PMT cannot reach a consensus. Each participant in the GA has one vote, and two thirds of the components of the GA constitute a quorum. The PC has one additional decisional vote.

The **Project Management Team (PMT)** oversees the effective coordination of the project. The PMT applies the decision of the GA and checks they do not overlap into nondelegated GA competences and are taken in the interest of the project. The PMT can also manage any issues that do not require GA approval and that imply or require intervention or agreement among WPLs.

**Work Package Leaders (WPLs)** will have responsibility for the individual work packages. They will also liaise with other WPL Leaders to ensure dependencies and interrelationships are efficiently managed.

The **Industrial Advisory Board (IAB)** will be composed of industrial experts as well as the representatives of the investment community to help with dissemination, exploitation and fund acquisition. The Industrial Advisory Board will be selected at the kick-off meeting and appointed within 6 months from the start of the project.

The **Innovation and Dissemination Manager (IDM)** is responsible for the management of all activities related to understanding the needs of the stakeholders, with the objective of successfully exploiting, developing and promoting innovations based on the project activities.

The **Scientific Officer (SO)** is in charge of monitoring the scientific and technological aspects of the project, in order to relieve the burden on the Project Coordinator.

The **Ethics Advisory Board (EAB)** will oversee the ethical aspects of the project ensuring the strict application of the HD030 ethical guidelines, the ethical assessment in Section 5 and Deliverable 9.2.

Figure 15 - Management structure - Consortium area

**Meet the Team**

**MARCELLO BONIFÉ** (Assistant Professor at University of Ferrara, UNIFE)  
 Electronic Engineer with a PhD on Information Engineering (Automatic Control). As an Assistant Professor and researcher, his teaching and research activities are focused on Control Theory, Control Systems Technology, Robotics and Industrial Automation.

**FABIO CUZZOLIN** (Professor of Artificial Intelligence - Director of the Visual Artificial Intelligence Lab, Oxford Brookes University)  
 A laurea degree magna cum laude and a Ph.D. degree. Researcher at Politecnico di Milano, the University of California at Los Angeles (UCLA) and INRIA Rhône-Alpes, Grenoble and Oxford Brookes University. He founded the Visual Artificial Intelligence Lab in 2012, and promoted to Professor of Artificial Intelligence. He holds advisory positions with Huawei Technologies and Metacore.ai.

**FEDERICA FERRACIUTI** (Professor Assistant presso Università degli Studi di Modena e Reggio Emilia, UNIMORE)  
 A Management Engineer with majors in robotics and automation and a PhD in Industrial Innovation Engineering, majors in Robotics. Her Research interests are: Human-Robot collaboration, Teleoperation, Control architectures for surgical robotics, Collaborative robotics.

**SABINE HESTLE** (Project Engineer at Medengineering - Surgical Robotics)  
 Master of Science (M.Sc.) Mechanical Engineering at the Technische Universität München.

**ALICIA CASALS** (Multitask coordination at Technical University of Catalonia, UPC)  
 Industrial Engineer, Professor at UPC. Research on medical robotics, both surgery and assistive technology. Leading the robotics and automation group of the Center of Research in Biomedical Engineering at UPC. Founder of two companies related to robotics surgery.

**ANDREW PAUL DENNISON** (Biomedical Research Engineer & Projects Manager for the M40 Group at the University of Dundee - Institute for Medical Science and Technology)  
 Research interests include image guided therapies and robotics, computer aided design & manufacture, medical devices and measurement systems. Degrees held in Cell & Prostatec Medical Technologies (MSc 2011), Design for Medical Technologies (MSc 2008) and Mechanical Engineering (BEng Hons 2007).

**STEFANO GRASSI** (Innovation Manager, Center for Advanced Technology in Health and Wellbeing at IRCCS Ospedale San Raffaele)  
 Master's Degree in Management of Research, Innovation and Technology at MIU Politecnico di Milano. He coordinate scientific needs with economic organization and staff objectives; sharing research results with potential users for commercial purposes.

**JOYCE JOY** (Biomedical Research Scientist at the university of Dundee, UNIDUNDEE)  
 Biomedical research scientist with a PhD, MSc and BSc in Biomedical Engineering. She is currently working as Research Physicist/Postdoctoral Research Scientist for the Magnetic Resonance Imaging (MRI) group at the Institute of Medical Science & Technology, University of Dundee. Her research focuses on validation of image guided therapies (IGTs) such as MRI and ultrasound guided focused ultrasound surgery.

Figure 16 - Meet the Team Page



### 1.5.2 Facebook Page

<https://www.facebook.com/SarasH2020/>



Figure 17 - Facebook Page

### 1.5.3 Twitter Profile

<https://twitter.com/SarasH2020>

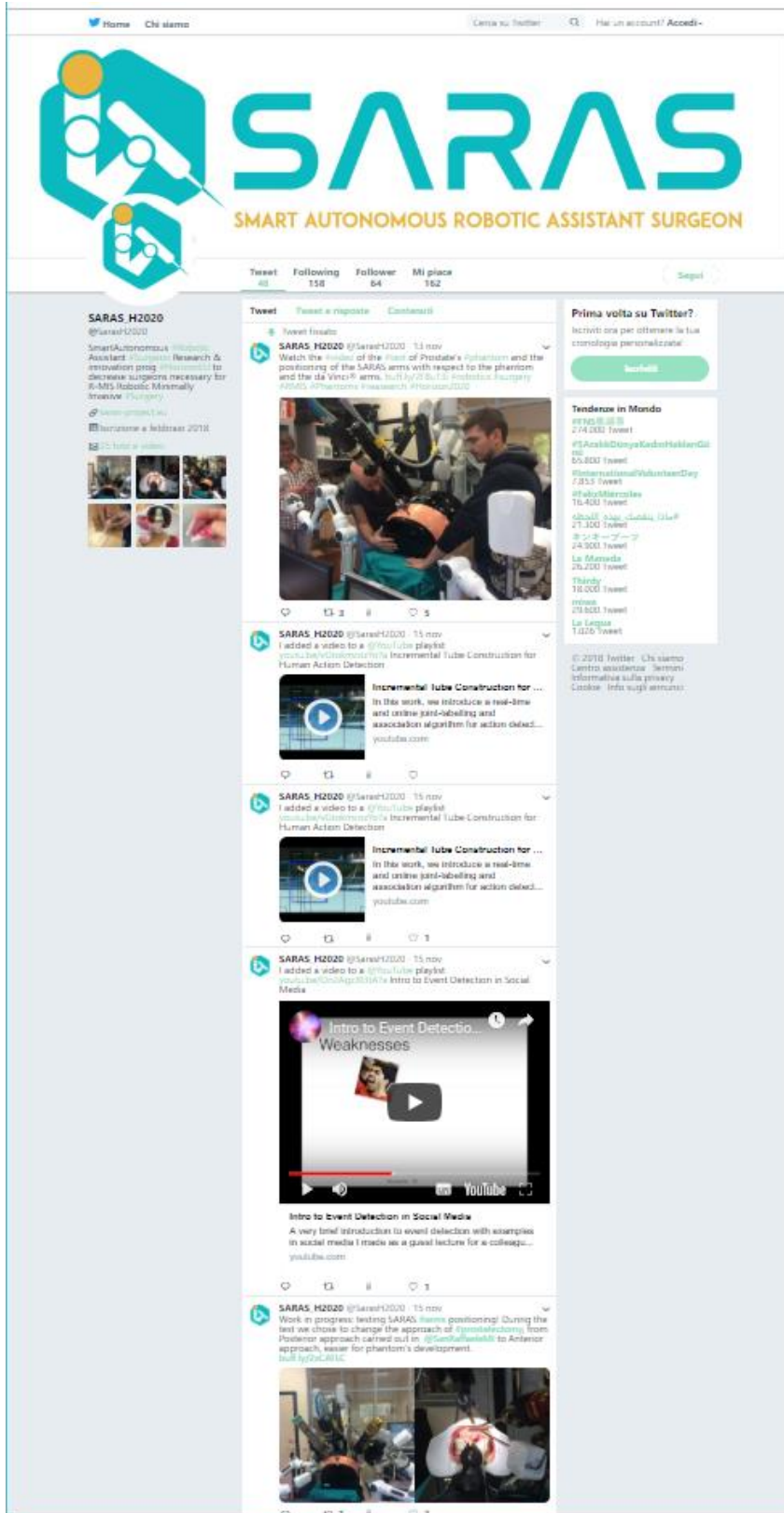


Figure 18 - Twitter page

### 1.5.4 LinkedIn Page

<https://www.linkedin.com/company/sarash2020/>

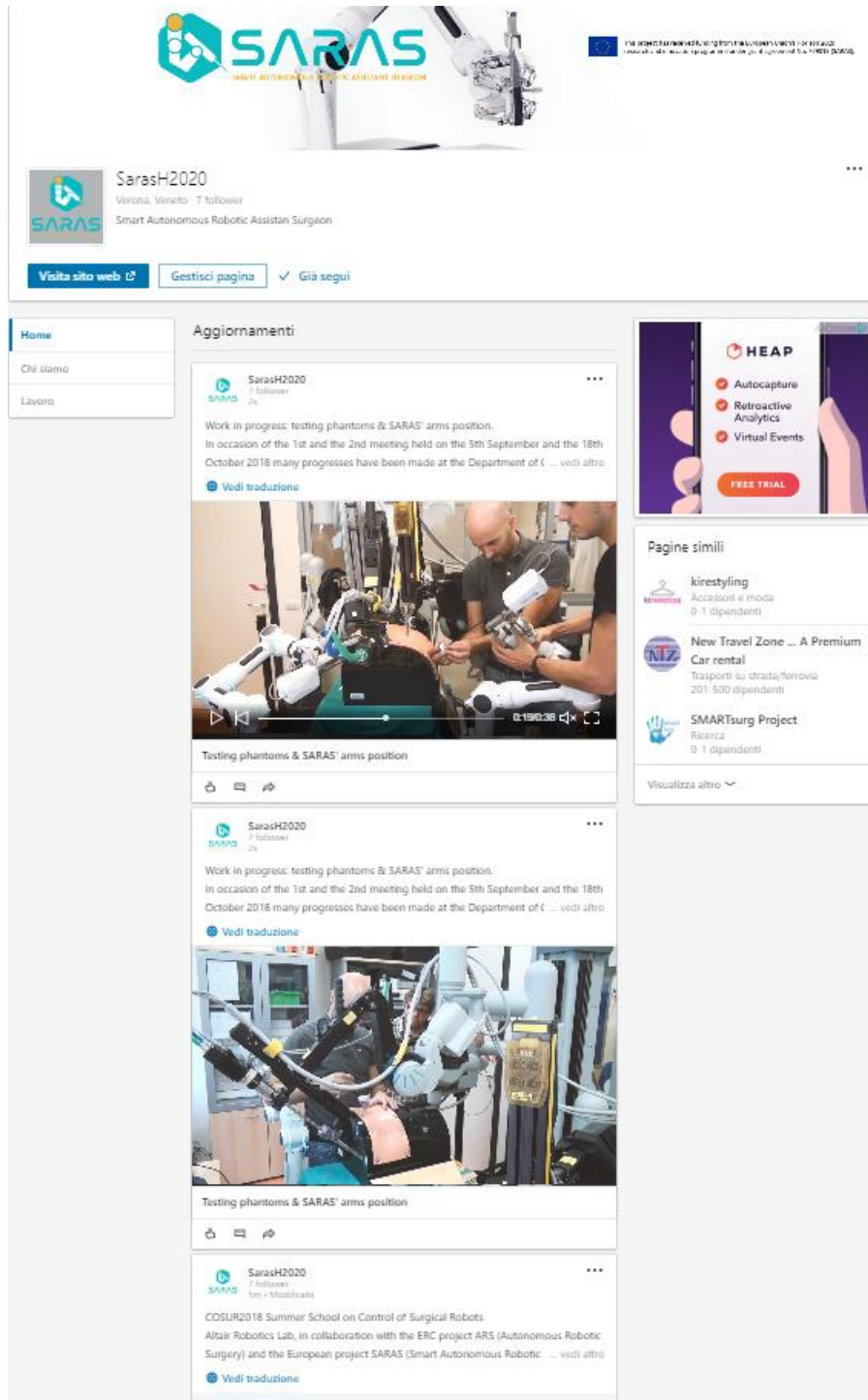


Figure 19 - LinkedIn Page



### 1.5.5 YouTube Channel

<https://www.youtube.com/channel/UCh3x52tiWIs8dsUTbiYNuDw>

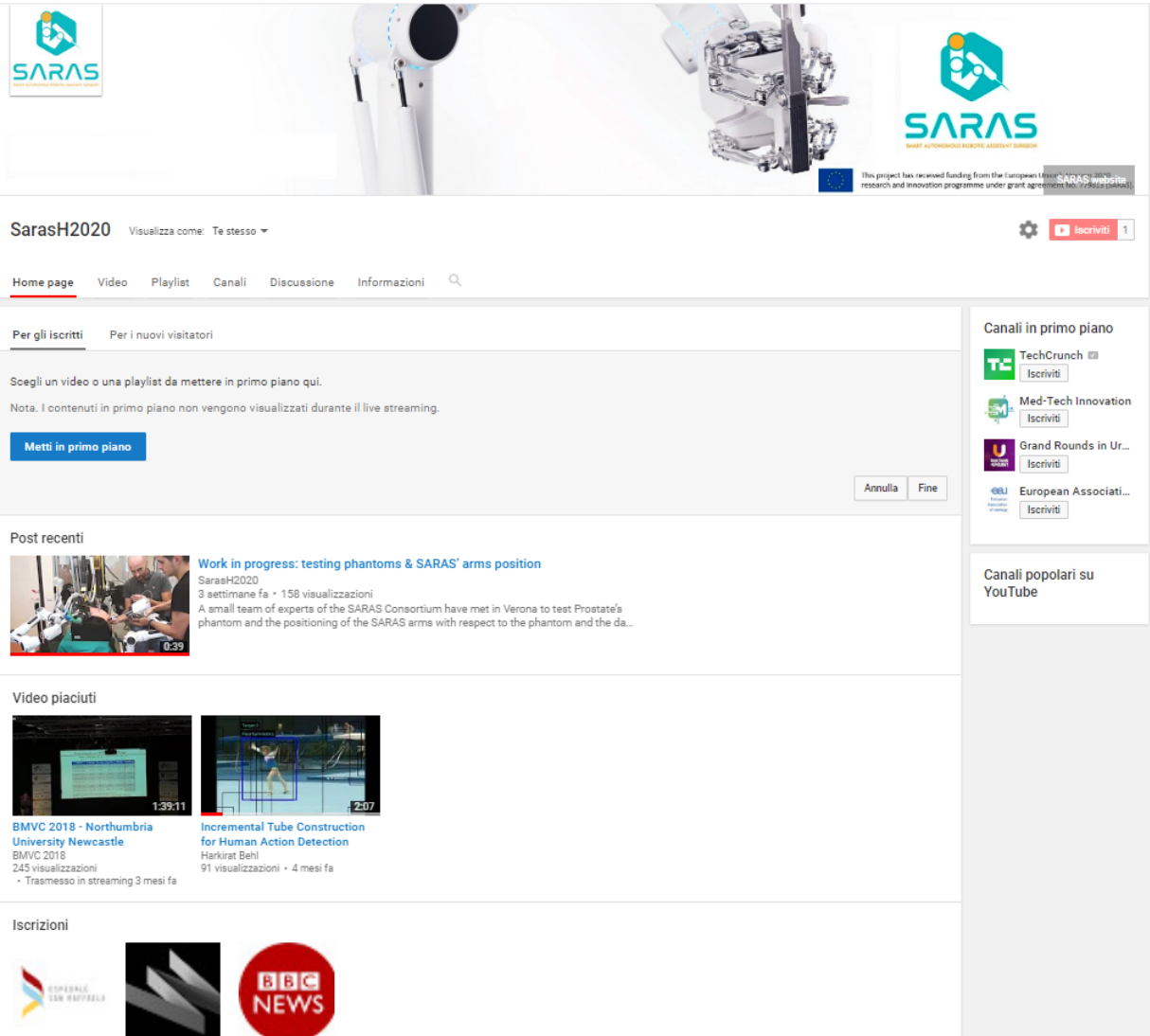


Figure 20 - YouTube Channel

## **Appendix B - Dissemination Report**

An effective dissemination is essential in order to ensure that research results are adapted for the specific target groups.

Here follows a report of all dissemination activities run from the 1<sup>st</sup> of January till the 4<sup>th</sup> of December 2018:

- Tables are extracted from the Dissemination Calendar
- Figures comes from website and social media activities

### **1.6 *Dissemination calendar***

1.6.1 PUBLICATIONS-JOURNALS-PAPERS

SARAS JOURNALS/PUBLICATIONS															
Date publishing	TITLE	Authors	Partner	Editors	Type of publication BOOK= Book/Chapter PAPER= Proceeding/Inproceeding/ConferencePaper JOURNAL= Journal/Article THESIS= Master Thesis	Abstract	Keywords	OPEN ACCESS Y/N	DOI	PDF	ISBN	ISSN	URL	status of publication	Conference Name /Book title/ Journal Name / School name
06/09/18	Recognition self-awareness for active object recognition on depth images.	Andrea Roberti, Marco Carletti, Francesco Setti, Umberto Castellani, Paolo Fiorini, and Marco Cristani	UNIVR	British Machine Vision Conference (BMVC). Newcastle-Upon-Tyne, UK. (bmvc2018.org).	PAPER= Proceeding/Inproceeding/ConferencePaper	We propose an active	Object recognition, ob	YES	NA	yes			<a href="http://bmvc2018.org/contents/papers/0593.pdf">http://bmvc2018.org/contents/papers/0593.pdf</a>	social + web	BMVC 2018
06/09/18	Incremental Tube Construction for Human Action Detection	Harkirat S. Behl, Michael Sapienza, Gurkirt Singh, Suman Saha, Fabio Cuzzolin and Philip H. S. Torr	OBU	Proceedings of BMVC 2018 (the British Machine Vision Conference), Newcastle, UK, Sep 2018	PAPER= Proceeding/Inproceeding/ConferencePaper	Current state-of-the-a	Computer Vision; Pattern Recognition	?	?	yes			<a href="https://arxiv.org/abs/1704.01358">https://arxiv.org/abs/1704.01358</a>	WEB	BMVC 2018
21/10/18	An energy saving approach to active object recognition and localization.	Andrea Roberti, Riccardo Muradore, Paolo Fiorini, Marco Cristani, Francesco Setti	UNIVR	Annual Conference of the IEEE Industrial Electronics Society (IECON), Washington, DC, USA	PAPER= Proceeding/Inproceeding/ConferencePaper	We propose an active	Active object recognition, reinforcement learning,	?	?	yes			NOT ONLINE - should I place it on ZENODO?	WEB	IECON 2018
01/08/18	TraMNet - Transition Matrix Network for Efficient Action Tube Proposals	Gurkirt Singh, Suman Saha, and F. Cuzzolin	OBU	Proceedings of ACCV 2018 (the Asian Computer Vision Conference), Perth, Australia, Dec 2018	PAPER= Proceeding/Inproceeding/ConferencePaper	Current state-of-the-a	Image and Video Processing, Computer vision, Pattern Recognition, Robotics	?	?	yes			<a href="https://arxiv.org/abs/1808.00297">https://arxiv.org/abs/1808.00297</a>	WEB	ACCV 2018
23/08/18	Predicting action tubes	Gurkirt Singh, Suman Saha and F. Cuzzolin	OBU	Proceedings of the ECCV 2018 Workshop on Anticipating Human Behaviour (AHB 2018), Munich, Germany, Sep 2018	PAPER= Proceeding/Inproceeding/ConferencePaper	In this work, we prese	Computer Vision and Pattern Recognition; Artificial Intelligence; Robotics	?	?	?			<a href="https://arxiv.org/abs/1808.07712">https://arxiv.org/abs/1808.07712</a>	WEB	ECCV 2018

Figure 21 - DISSEMINATION CALENDAR: Sheet 1

In teal closed and done activities.

1.6.2 CONFERENCES

SARAS CONFERENCES & INVITED LECTURE										
Date	Title (Conference)	Title (Publication)	Theme	PARTNER ATTENDING	Details	Venue	Year	Audience	URL	NOTES
03/09/18	BMVC 2018	Paper "Recognition self-awareness for active object recognition on depth images" + Paper ""Incremental Tube Construction for Human Action Detection""	Computer vision	UNIVR + OBU	29TH BRITISH MACHINE VISION CONFERENCE	Newcastle, UK	2018	Researchers (T3)	<a href="http://bmvc2018.org/index.html">http://bmvc2018.org/index.html</a>	web
07/09/18	EMVA European Machine Vision Forum	SARAS' Poster	Computer vision	UNIVR	The flagship annual conference of the IEEE Industrial Electronics Society (IES), focusing on industrial and manufacturing theory and applications of controls, communications, instrumentation, electronics, and computational intelligence.	Italy - Bologna	2018	Researchers (T3)	<a href="https://www.emva-forum.org/">https://www.emva-forum.org/</a>	web
22/10/18	IECON2018	paper "An energy saving approach to active object recognition and localization"		UNIVR	The flagship annual conference of the IEEE Industrial Electronics Society (IES), focusing on industrial and manufacturing theory and applications of controls, communications, instrumentation, electronics, and computational intelligence.	Washington DC, USA	2018	Researchers (T3)	<a href="http://iecon2018.org/">http://iecon2018.org/</a>	web
02/12/18	ACCV 2018	TraMNet - Transition Matrix Network for Efficient Action Tube Proposals	Computer vision	OBU	The Conference will be held in the Perth Conv	Perth, Australia	2018	Researchers (T3)	<a href="http://accv2018.net/">http://accv2018.net/</a>	web
08/09/18	ECCV 2018	OBU presenting paper "Predicting action tubes"	Computer vision	OBU	The European Conference on Computer Vision 2018 in Munich, Germany. This constitutes by far the largest ECCV ever. With near 3200 registered participants and another 650 on the waiting list as we write, participation has more than doubled since the last ECCV in Amsterdam.	Munich, Germany	2018	Researchers (T3)	<a href="https://eccv2018.org/">https://eccv2018.org/</a>	web

Figure 22 - DISSEMINATION CALENDAR: Sheet 2

In teal closed activities, in red the planned ones.

## 1.6.3 EVENTS

SARAS EVENTS										
#Month	Title	Category	Theme	Details	Venue	Date	Year	Audience	Website (if available)	Partners
M2	SIC 2018 - Primo Convegno delle Società Chirurgiche della Campania, Puglia, Basilicata, Calabria Sicilia.	Congress/Conference	Robotics		Naples, Italy	12.02.		Healthcare Experts (T2)		OSR
M3	ERF2018 -The European Robotics Forum	Exhibition	Robotics		Tampere, Finland	13.-15.03.		European companies (T4)	<a href="https://www.eu-robotics.net/robotics_forum/info/index.html">https://www.eu-robotics.net/robotics_forum/info/index.html</a>	UNIVR
M5	AEDV 2018 46th National Conference on Dermatology and Venereology	Congress/Conference	Other	Surgical Training	Mallorca, Spain	9.-12.05.	2018	Healthcare Experts (T2)	<a href="https://web.congressoedv.net/">https://web.congressoedv.net/</a>	UPC
M17	ICRA2019 - IEEE International Conference on Robotics and Automation	Congress/Conference	Robotics		Montreal, Canada	20.-24.05.	2019	Researchers (T3)	<a href="https://icra2019.org/">https://icra2019.org/</a>	UPC, UNIMORE

Figure 23 - DISSEMINATION CALENDAR: Sheet 3

In teal closed activities, in red the tentative planned ones.

1.6.4 WORKSHOPS

SARAS WORKSHOPS									
#Month	Title	Details	Venue	Date	Year	Audience	Formula	Website (if available)	Partners
M6	2 MelaTx Workshop	Surgical training	Sevilla, Spain		2018	Healthcare Experts (T2)	SARAS Workshop for clinical staff		UPC
M10	IROS Conference	Conference paper: Estimation of Interaction Forces in Robotic Surgery using a Semi-Supervised Deep Neural Network Model	Madrid Municipal Conference Centre	2 October		Researchers (T3)	Session Medical Robotics	<a href="https://www.iros2018.org/">https://www.iros2018.org/</a>	UPC
M18	SARAS Workshop for clinical staff				2019	Healthcare Experts (T2)	SARAS Workshop for clinical staff		
M22	HFR2019 12th International Workshop on Huma-friendly robotics		Reggio Emilia	24-25 October	2019	Researchers (T3)		tbd	unimore/unife
M22	SARAS Workshop Y2 - results - achievements - targets	The workshops will summarise the results of the project, present the achievements obtained (including demonstrations), and outline the desired targets for the next period. Participants and speakers will be researchers representing SARAS' two major fields of application (robotics and surgery), and will not be restricted to project partners but will also crucially include outside experts and representatives of the disciplines involved. These workshops will also highlight the impact of SARAS' abilities (cognition and perception, interaction, autonomy and safety) in other research fields. - This workshop raises awareness of the project's results (MS7).			2019	Researchers (T3)	SARAS Workshop Y2 - results - achievements - targets		
M30	SARAS Workshop with Industrial Players				2020	European companies (T4)	SARAS Workshop with Industrial Players		
M34	SARAS Workshop Y3 - results - achievements - targets	The workshops will summarise the results of the project, present the achievements obtained (including demonstrations), and outline the desired targets for the next period. Participants and speakers will be researchers representing SARAS' two major fields of application (robotics and surgery), and will not be restricted to project partners but will also crucially include outside experts and representatives of the disciplines involved. These workshops will also highlight the impact of SARAS' abilities (cognition and perception, interaction, autonomy and safety) in other research fields.			2020	Researchers (T3)	SARAS Workshop Y3 - results - achievements - targets		
M36	SARAS Final demonstration of the SARAS system in OSR	A final demonstration and exhibition event at OSR, to raise interest in the future exploitation of SARAS system.			2020	Healthcare Experts (T2)	SARAS Final demonstration of the SARAS system in OSR		

Figure 24 - DISSEMINATION CALENDAR: Sheet 4

In teal closed activities, in red the tentative planned ones.

## 1.6.5 MEETINGS

#Month (tentative)	Venue	Date (tentative)	Type of meeting	Date	month	year	Status
M1	OSR	January 16-17, 2018	Kick-off meeting	16-17th	January	2018	Closed
M9	UPC	September 2018	Project meeting & Remote Review Meeting	25-26TH	September	2018	Closed
M12	UNIVR	early December 2018	Integration week for MULTI-ROBOT SURGERY platform (+ video)		December	2018	
M15	MEDIN	March 2019	Project meeting	12-13th	March	2019	
M18+2	UNIVR	September 2019	Mid-term review meeting		September	2019	
M24	UNIVR	early December 2019	Integration week for SOLO SURGERY platform (+ video)		December	2019	
M27	TBD @ ERF20	March 2020	Project meeting		March	2020	
M36	UNIVDUN	early December 2020	Integration week for LAPARO SURGERY platform (+ video)		December	2020	
M36+2	UNIVDUN	February 2021	Final Review meeting (with video of SOLO SURGERY platform)		february	2021	

Figure 25 - DISSEMINATION CALENDAR: Sheet 5

In teal closed activities, in black the planned ones.

## 1.7 Dissemination activities

### 1.7.1 PUBLICATIONS-JOURNALS-PAPERS

On the website there is a dedicated section “Publications<sup>11</sup>” where Researchers can find all publications and access the PDF file or the publisher landing page to purchase it.

The screenshot shows the SARAS Project website's Publications page. The header includes the SARAS logo and navigation links: Home, Project, Consortium, Publications, News, and Contact. The page title is 'Publications' with the subtitle 'Saras Project official site'. A search bar is located on the right side. The main content area lists publications for the year 2018, with filters for years, types, authors, and users. The first publication is 'An energy saving approach to active object recognition and localization' by Andrea Roberti, Riccardo Muradore, Paolo Fiorini, Marco Cristani, and Francesco Setti, presented at the Annual Conference of the IEEE Industrial Electronics Society (IECON) in Washington, DC, USA, 2018. The second publication is 'Recognition self-awareness for active object recognition on depth images' by Andrea Roberti, Marco Carletti, Francesco Setti, Umberto Castellani, Paolo Fiorini, and Cristani, Marco, presented at BMVC 2018. The third publication is 'Predicting action tubes' by Gurkirt Singh, Suman Saha, and Cuzzolin, Fabio, presented at TramNet - Transition Matrix Network for Efficient Action Tube Proposals. The fourth publication is 'TraMNet - Transition Matrix Network for Efficient Action Tube Proposals' by Gurkirt Singh, Suman Saha, Cuzzolin, Fabio, presented at TramNet. The fifth publication is 'Incremental Tube Construction for Human Action Detection' by Harkirat S. Behl, Michael Sapienza, Gurkirt Singh, Suman Saha, Fabio Cuzzolin, and Philip H S, presented at TramNet. On the right side, there are social media follow buttons for Facebook and Twitter, and a section for 'Follow SARAS on Facebook' with a post about testing SARAS arms positioning. Below that is a section for 'Follow SARAS on Twitter' with a tweet from @SarasH2020 mentioning a YouTube video about Incremental Tube Construction for Human Action Detection.

Figure 26 - Publication Page in the Website

<sup>11</sup> [https://saras-project.eu/?page\\_id=894](https://saras-project.eu/?page_id=894)



Recognition self-awareness for active object recognition on depth images

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Abstract

We propose an active object recognition framework that introduces the *recognition self-awareness*, which is an intermediate level of reasoning to decide which views to cover during the object exploration. This is built first by learning a multi-view deep 3D object classifier; subsequently, a 3D dense saliency volume is generated by fusing together single-view visualization maps, these latter obtained by computing the gradient map of the class label on different image planes. The saliency volume indicates which object parts the classifier considers more important for deciding a class. Finally, the volume is injected in the observation model of a Partially Observable Markov Decision Process (POMDP). In practice, the robot decides which views to cover, depending on the expected ability of the classifier to discriminate an object class by observing a specific part. For example, the robot will look for the engine to discriminate between a bicycle and a motorbike, since the classifier has found that part as highly discriminative. Experiments are carried out on depth images with both simulated and real data, showing that our framework predicts the object class with higher accuracy and lower energy consumption than a set of alternatives.

1 Introduction

Active object recognition (AOR) allows to consider different views of the test object, overcoming the single-view hypothesis of classical object recognition, making the classification problem much easier in principle. Unfortunately, this freedom comes with a price, which is that of maneuvering the sensor for selecting informative images: in fact, not all the views are equally discriminative [21], too similar images are not informative and the movements of

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Incremental Tube Construction for Human Action Detection

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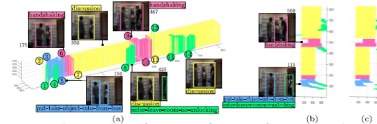


Figure 1: (a) Illustration results on a video sequence from the LWS-HARL dataset [2]. Two people enter a room and put items on objects from a box (frame 150). They then shake hands (frame 275) and start having a discussion (frame 350). In frame 450, another person enters the room, shakes hands, and then joins the discussion. Each action tube instance is numbered and colored according to its action category. We selected this video to show that our tube construction algorithm can handle very complex situations in which multiple distinct action categories occur in sequence and at concurrent times. (b) Action tubes drawn as viewed from above, compared to (c) the ground truth action tube.

Abstract

Current state-of-the-art action detection systems are tailored for offline batch-processing applications. However, for online applications like human-robot interaction, current systems fall short. In this work, we introduce a real-time and online joint-labeling and association algorithm for action detection that can incrementally construct space-time action tubes on the most challenging untrimmed action videos in which different action categories occur concurrently. In contrast to previous methods, we solve the linking, action labeling and temporal localization problems jointly in a single pass. We demonstrate superior online association accuracy and speed (1.5ms per frame) as compared to the current state-of-the-art offline and online systems.

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Predicting Action Tubes

Gurkirt Singh, Suman Saha, and Fabio Cuzzolin  
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**Abstract.** In this work, we present a method to predict an entire ‘action tube’ (a set of temporally linked bounding boxes) in a trimmed video just by observing a smaller subset of it. Predicting where an action is going to take place in the near future is essential to many computer vision based applications such as autonomous driving or surgical robotics. Importantly, it has to be done in real-time and in an online fashion. We propose a Tube Prediction network (TPnet) which jointly predicts the past, present and future bounding boxes along with their action classification scores. At test time TPnet is used in a temporal sliding window setting, and its predictions are put into a temporal prediction framework to construct/predict the video long action tubes not only for the observed part of the video but also for the unobserved part. Additionally, the proposed action tube predictor helps in completing action tubes for unobserved segments of the video. We quantitatively demonstrate the later ability, and the fact that TPnet improves state-of-the-art detection performance, on one of the standard action detection benchmarks - HMDB-21 dataset.

1 Introduction

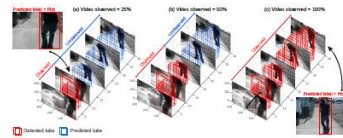


Fig. 1. An illustration of the action tube prediction problem using an example in which a ‘pick-up’ action is being performed on a sidewalk. As an ideal case, we want the system to predict an action tube as shown in (c) (i.e. when 100% of the video has been processed) just by observing 25% of the entire clip (a). We want the tube predictor to predict the action class label (shown in red) alongside predicting the spatial location of the tube. The red shaded bounding boxes denote the observed tube in the observed portion of the input video, whereas, the blue coloured bounding boxes represent the future predicted action tube for the unobserved part of the clip.

arXiv:1808.07712v1 [cs.CV] 23 Aug 2018

TraMNet - Transition Matrix Network for Efficient Action Tube Proposals

Gurkirt Singh, Suman Saha, and Fabio Cuzzolin  
Visual Artificial Intelligence Laboratory (VAIIL)<sup>1</sup>, Oxford Brookes University  
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**Abstract.** Current state-of-the-art methods solve spatio-temporal action localisation by extending 2D anchors to 3D cuboid proposals on stacks of frames, to generate sets of temporally connected bounding boxes called *action micro-tubes*. However, they fail to consider that the underlying anchor proposal hypotheses should also move (transition) from frame to frame, as the actor or the camera do. Assuming we evaluate  $n$  2D anchors in each frame, then the number of possible transitions from each 2D anchor to the next, for a sequence of  $f$  consecutive frames, is in the order of  $O(n^2)$ , expensive even for small values of  $f$ . To avoid this problem we introduce a **Transition-Matrix-based Network (TraM-Net)** which relies on computing transition probabilities between anchor proposals while maximising their overlap with ground truth bounding boxes across frames, and enforcing sparsity via a transition threshold. As the resulting transition matrix is sparse and stochastic, this reduces the proposal hypothesis search space from  $O(n^2)$  to the cardinality of the thresholded matrix. At training time, transitions are specific to cell locations of the feature maps, so that a sparse (efficient) transition matrix is used to train the network. At test time, a denser transition matrix can be obtained either by decreasing the threshold or by adding to it all the relative transitions originating from any cell location, allowing the network to handle transitions in the test data that might not have been present in the training data, and making detection transition-invariant. Finally, we show that our network is able to handle sparse annotations such as those available in the DAILY dataset, while allowing for both dense (accurate) or sparse (efficient) evaluation within a single model. We report extensive experiments on the DAILY, UCF101-24 and TransitionUCF101-24 datasets to support our claims.

1 Introduction

Current state-of-the-art spatiotemporal action localisation works [1–3] focus on learning a spatiotemporal multi-frame 3D representation by extending frame-level 2D object detection approaches [4–11]. These networks learn a feature representation from pairs [1] or chunks [2, 3] of video frames, allowing them to implicitly learn the temporal correlations between inter-frame action regions (bounding boxes). As a result, they can predict micro-tubes [1] or tubesets [2], i.e. temporally linked frame-level detections for short subsequences of a test video clip. Finally, these micro-tubes are linked [1–3] in time to locate action tube instances [11] spanning the whole video.

<sup>1</sup>This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No. 779813 (SARAS)

An energy saving approach to active object recognition and localization

Andra Roberti, Riccardo Marandù, Paolo Fiorini, Marco Cristani, Francesco Setti  
Dept. of Computer Science, University of Verona - Verona, Italy  
{andra.roberti,riccardo.marandu,paolo.fiorini,marco.cristani}@univr.it

**Abstract.** We propose an active object recognition (AOR) system explicitly tailored to work with a real robot arm. No. For AOR applications, most of them related to classification accuracy, classification confidence, number of views etc. discarding physical and energetic constraints and what has to follow. Our strategy explicitly considers manipulability and energetic terms in the planning optimization. The manipulability term avoids the robotic arm to encounter singularities, which require expensive and straining backtracking steps. The energetic term deals with the arm energy consumption when in static conditions, which is crucial in AOR applications where time is spent in the shoulder hold-up. Before we do the real tests, several experiments have been carried out on a simulator. This provides some motivation for a multi-objective optimization task. This allows to approximate the improvement of our solution with respect to other competitors obtained on a simulation only.

**Index Terms.** Active object recognition, reinforcement learning, POMDP

1 INTRODUCTION

In the robotics context, a correct scene interpretation plays a crucial role in the decision making process that follows. Think for example at collaborative robots that have to perform specific tasks while interacting with human agents. Autonomous collaborative robots are usually asked to explore the space they are navigating, to understand the 3D structure of the environment, and understand the scene semantics. All these modules are part of a single higher level task usually called perception, and will be used to decide which action to take and to plan the motion according to specific goals.

Action perception is a specific case on perception when the agent, also called active perceiver, dynamically determines its behaviour according to the goal of perception – i.e. understood – the environment. The main benefit in using active perception instead of the static approach is that the confidence in recognition can be increased by dynamically addressing an artificial agent, as argued by Tachibana [23]. Within several sources of information that the perceiving agent is in contact

with, objects are the main elements to reason about when trying to infer a semantic understanding of a visual scene [26]. Active object recognition (AOR) [24] consists in recognizing one or more objects with a moving sensor that can observe the scene under different points of view. Different disciplines have been involved with this topic. Computer vision techniques focus on how to cover the scene in order to capture maximally informative object views. Reinforcement learning studies planning strategies to minimize homogeneous costants, like classification accuracy, classification confidence, number of views, etc. Few of these approaches consider that the sensor has to be moved by a robotic arm [1], since this makes the optimization hard, due to the highly nonlinear mathematical model of robotic manipulators.

In this paper, we propose an AOR approach that takes into account the robot’s structure and capabilities. We model the sensor planning as a Partially Observable Markov Decision Process (POMDP). POMDP allows to sample the optimization space in a very efficient manner, and the objective function to minimize can be easily enriched with arbitrary terms. Specifically, here the robot should be able to recognize multiple objects by minimizing the estimated energy consumption and, at the same time, by considering manipulability constraints. Energy constraints are important especially when the objects to recognize are more than one, requiring the robot to get many scene acquisitions, in order to deal with occluded objects that are visible only from few particular points of view.

Manipulability constraints amount to let the robotic arm avoid singular configurations, that otherwise force it to perform expensive and straining backtracking steps.

These two concerns have never been taken into account jointly in an AOR framework; moreover, most of the designed approaches have been tested on simulations. Our focus here is to move on real systems, and specifically on a redundant, 7-DOF Panda arm manipulator<sup>1</sup>.

We report experiments with a real tabletop scenario with several objects belonging to four different, but similar, semantic classes. Results show that we outperform the state of the art in AOR both in object classification and in localization precision. Doing this, our method is also able to converge to a prediction earlier than the competitor and with a higher

<sup>1</sup>The work has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No. 779813 (SARAS) project. The work has been partially supported by the grant of the Italian Ministry of Education, University and Research (MUR).  
<sup>2</sup>http://www.fanuc.com/

Figure 27 - Publications preview

## 1.7.2 CONFERENCES

BMVC 2018 - The British Machine Vision Conference (BMVC) is the British Machine Vision Association (BMVA) annual conference on machine vision, image processing, and pattern recognition.

SARAS Partners presented two papers: the videos of both presentations are available on the website in the event page, in the YouTube Channel and have been posted on Twitter.

**Pocket Programme Guide**  
**British Machine Vision Conference 2018**  
 3rd – 6th September 2018  
 Northumbria University

The British Machine Vision Conference (BMVC) is the British Machine Vision Association (BMVA) annual conference on machine vision, image processing, and pattern recognition.

It is one of the major international conferences on computer vision and related areas held in the UK. As its increasing popularity and quality, it has established as a prestigious event on the vision calendar.

We propose an active object recognition framework that introduces the recognition self-awareness, which is an intermediate level of reasoning to decide which views to cover during the object exploration. This is built first by learning a multi-view deep 3D object classifier; subsequently, a 3D dense saliency volume is generated by fusing together single-view visualization maps, these latter obtained by computing the gradient map of the class label on different image planes. The saliency volume indicates which object parts the classifier considers more important for deciding a class. Finally, the volume is injected in the observation model of a Partially Observable Markov Decision Process (POMDP).

In practice, the robot decides which views to cover, depending on the expected ability of the classifier to discriminate an object class by observing a specific part. For example, the robot will look for the engine to discriminate between a bicycle and a motorbike, since the classifier has found that part as highly discriminative. Experiments are carried out on depth images with both simulated and real data, showing that our framework predicts the object class with higher accuracy and lower energy consumption than a set of alternatives.

Our Partners presented the Paper "Recognition self-awareness for active object recognition on depth images"  
 Andrea Roberti (University of Verona); Marco Carletti (University of Verona); Francesco Setti (University of Verona)\*; Umberto Castellani (University of Verona); Paolo Fiorini (N/A); Marco Cristani (University of Verona)

**Tags**

3D object classifier arms assisted surgery  
 Board Chirurgia Cognition computer vision  
 Conference Consortium Control  
 CyberSecurity ERF2018 Europe event forum  
 hands-on  
 Human-robot-collaboration  
 industry industry 4.0 Kick off lectures  
 machine vision meeting multidisciplinary  
 Network object exploration Object recognition  
 partners phantoms PhD students Plans POMDP  
 Post-Doctoral Productivity Project  
 research Robot Robotics School  
 Strategy Students Surgery Surgical  
 Task Technologic

**WHAT THEY SAY ABOUT US**

**Latest News**

- Work in progress: testing phantoms & SARAS' arms position
- THE MULTIROBOTS-SURGERY
- PROJECT MEETING M9 - Barcelona in September 25-26, 2018
- COSUR 2018: SOME NUMBERS FROM THE 2ND EDITION
- THE 2ND MetaTXWORKSHOP - Seville in June 6-8, 2018

**Upcoming Events**

The 14th Asian Conference on Computer Vision – ACCV 2018  
 December 2 - December 6

[View All Events](#)

Figure 28 - The BMVC 2018 Event Page

Our Partner UNIVR presented the Paper “Recognition self-awareness for active object recognition on depth images”.



Figure 29 - The video of UNIVR presentation

Our Partner OBU presented the paper “Incremental Tube Construction for Human Action Detection”.

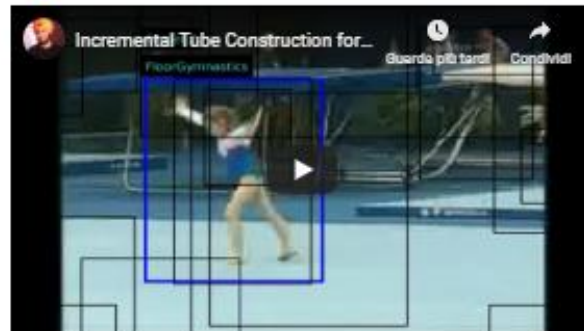


Figure 30 - The Video of OBU presentation

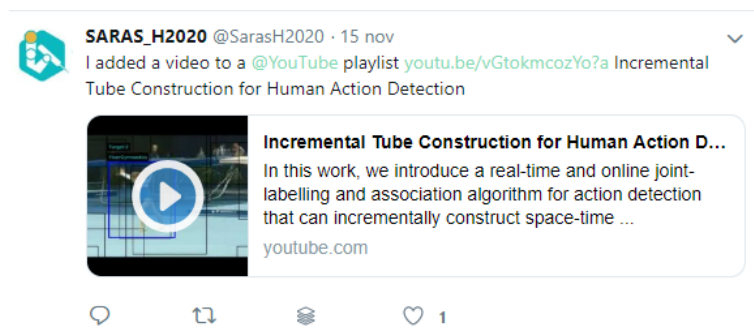


Figure 31 - Twitter post of the OBU Paper

EMVA 2018 - Third European Machine Vision Forum (EMVA), an annual event with the aim to foster interaction between the machine vision industry and academic research to learn from each other.

The screenshot shows the SARAS Project official website. At the top, there is a navigation menu with links for Home, Project, Consortium, Publications, News, and Contact. Below the menu, the page title is "Saras Project official site". The main content area is titled "EMVA 2018 - Third European Machine Vision Forum" and includes a sub-header "Where research meets industry". The text describes the forum as a new annual event of the European Machine Vision Association (EMVA) aimed at fostering interaction between the machine vision industry and academic research. It mentions that the forum fills an important gap by building on the success of the Heidelberger Bildverarbeitungsforum. A speaker, Francesco Setti, is listed as presenting a SARAS poster. On the right side, there is a search bar, a "Follow SARAS on Facebook" button, and a "Follow SARAS on Twitter" button. A social media feed shows a tweet from SARAS\_H2020 about the 5th September SARAS poster being presented at the forum.

Figure 32 - EMVA event page

The screenshot shows a tweet from SARAS\_H2020 (@SarasH2020) posted 31 days ago. The text of the tweet reads: "The 5th september SARAS' poster will be presented at the 3rd European Machine Vision Forum Bologna buff.ly/2mlTH5F #MachineVision #emva #vision @emva\_org #Industry40". Below the text is a composite image featuring a panoramic view of Bologna, Italy, with the St. Petronio Basilica and the Leaning Tower of Bologna. To the right of the image is the EMVA logo, which consists of a stylized 'em' with colorful arrows pointing outwards, and the text "emva in machine vision assn".

Figure 33 - EMVA 2018 Tweet



IECON2018 – this is the flagship annual conference of the IEEE Industrial Electronics Society (IES), focusing on industrial and manufacturing theory and applications of controls, communications, instrumentation, electronics, and computational intelligence.

The screenshot shows the official website for the IECON 2018 event. At the top, the SARAS logo is displayed alongside navigation links for Home, Project, Consortium, Publications, News, and Contact. The main content area features the event title, dates, and a prominent graphic for the IEEE IES IECON 2018 conference held in Washington, DC. Text on the page describes the conference as a flagship event for the IEEE Industrial Electronics Society, focusing on industrial and manufacturing theory and applications. It mentions that over 1,000 papers were presented and lists several authors. A grid of four photographs illustrates various conference activities, including presentations and hands-on sessions. On the right-hand side, there is a search bar, a tweet from @SARAS\_H2020, and a list of tags related to the event and its focus areas.

Figure 34 - IECON 2018 Event Page

ECCV 2018 - The European Conference on Computer Vision 2018 in Munich, Germany. Our partners from the Oxford Brookes University – OBU presented on the Session the Paper "Predicting Action Tubes" between 14:00 and 15:00 Saturday 8th afternoon, Room: N1080ZG.

The screenshot shows the SARAS Project official site for the ECCV 2018 event page. The page layout includes a header with the SARAS logo and navigation links (Home, Project, Consortium, Publications, News, Contact). Below the header, there is a search bar and a section for "All Events". The main content area features a large banner for "ECCV 2018 European Conference on Computer Vision" held from September 8-14 in Munich, Germany. The text describes the conference as the largest ever, with nearly 3200 registered participants and another 650 on the waiting list. It highlights a major innovation: the free perpetual availability of all conference and workshop papers, which is often referred to as open access. The page also mentions that SARAS project is participating in the conference, specifically in the session "Predicting Action Tubes" on Saturday 8th afternoon, Room: N1080ZG. The page includes social media links for Facebook and Twitter, and a tweet from SARAS\_H2020 mentioning a YouTube playlist for "Incremental Tube Construction for Human Action Detection".

Figure 35 - ECCV 2018 Event Page

### 1.7.3 EVENTS

Archives: [Saras Project official site](#) Home / Page

#### Events for October 2018

EVENTS IN: 2018-10 SEARCH: Keyword FIND EVENTS VIEW AS: Month

MONDAY	TUESDAY	WEDNESDAY	THURSDAY
1	2	3	4
8	9	10	11
15	16	17	18
22	23	24	25
29	30	31	1

**The 44th Annual Conference of the IEEE - IECON 2018**  
October 21 - October 23

IECON is the flagship annual conference of the IEEE Industrial Electronics Society (IES), focusing on industrial and manufacturing theory and applications of controls, communications, instrumentation, electronics, and computational intelligence. This year's IECON is bringing a selection of over 1,000 papers, a record-breaking number of papers and attendees of all IECON conferences held in U.S. Papers [...]

Work in progress: testing SARAS arms positioning! During the test we chose to change the approach of #prostactomy, from Posterior approach carried out in San Raffaele Hospital @ospedalesanraffaele to Anterior approach, easier for phantom's development.

Work in progress: testing phantoms & SARAS' arms position - Saras Project saras-project.eu

Work in progress: testing phantoms & SARAS' arms position Nov 6, 2018 Leave a Reply Meetings, Work in Progress arms.

Follow SARAS on Facebook

Follow SARAS on Twitter

Tweets by @SarasH2020

SARAS\_H2020 @SarasH2020 I added a video to a @YouTube playlist [youtu.be/vGokmoozYo?si=Incremental Tube Construction for Human Action Detection](#)

Figure 36 - Calendar View of the Event page in the website

The screenshot shows the SARAS website's 'Archives: Events' page. At the top, there is a navigation bar with links for Home, Project, Consortium, Publications, News, and Contact. Below this, the page title is 'Archives: Events' with a sub-link 'Saras Project official site'. A search bar is located on the right side. The main content area is titled 'Events for January 16 - September 14' and features a filter section with 'EVENTS FROM 2018-10', 'SEARCH Keyword', and 'FIND EVENTS' buttons. A 'VIEW AS List' option is also present. The events are organized by month: January 2018, February 2018, March 2018, July 2018, and September 2018. Each event entry includes a title, dates, location, a brief description, and a 'Find out more' link. On the right side, there are social media follow buttons for Facebook and Twitter, along with a 'Tags' section listing various topics like '3D object classifier', 'arms', 'assisted surgery', etc. At the bottom right, there is a 'WHAT THEY SAY ABOUT US' section with a video thumbnail and a 'Latest News' section listing recent updates.

Figure 37 - The list view of the Event Page on the website



SIC 2018: 1<sup>st</sup> Congress of Surgical societies of Campania, Puglia, Basilicata, Calabria, Sicilia.  
 A Congress held in Naples – Italy the 12<sup>th</sup> February 2018 for Healthcare Experts and organized by the Circolo Ufficiali della Marina Militare.

The screenshot shows the SARAS project website. At the top, there is a navigation bar with the SARAS logo and links for Home, Project, Consortium, Publications, News, and Contact. Below the navigation bar, the page title reads "SIC 2018 – Primo Convegno delle Società Chirurgiche della Campania, Puglia, Basilicata, Calabria Sicilia." The main content area features a large yellow poster for the congress, titled "IL PONTE CHIRURGICO DELLE DUE SICILIE: LA VIA DELLE NUOVE TECNOLOGIE E DEL ROBOT". The poster includes a map of the region and details about the event: "1° CONVEGNO DELLE SOCIETÀ CHIRURGICHE DELLA CAMPANIA, PUGLIA, BASILICATA, CALABRIA, SICILIA" held in Naples on February 12, 2018, organized by the Circolo Ufficiali della Marina Militare. Below the poster, there is a profile of Eng. D. Trojaniello, who is presenting new perspectives in robotic surgery. The text describes the SARAS project's goal to develop a next-generation surgical robotic system that allows a single surgeon to perform minimally invasive surgery. The right sidebar contains social media follow buttons for Facebook and Twitter, a search bar, and a list of tweets related to the project.

Figure 38 - SIC 2018 Event page

ERF 2018: The European Robotics Forum (ERF2018), the most influential meeting of the robotics community in Europe, in Tampere, Finland, on 13-15 March 2018, organized for European robotics top experts are expected to attend the conference.



The European Robotics Forum (ERF2018), the most influential meeting of the robotics community in Europe, will be held in Tampere, Finland, on 13-15 March 2018.

Over 800 European robotics top experts are expected to attend the conference. Under the theme "Robots and Us", ERF2018 covers current societal and technical themes related to the field of robotics. Interesting subjects will be discussed, including human-robot-collaboration and how robotics can improve industrial productivity and service sector operations.

Researchers, engineers, managers, and a growing number of entrepreneurs, business people, and public funding officers from all over Europe come together to discuss technology push and market pull and how innovation in robotics can be accelerated.

ERF2018 features an exhibition, where companies, universities and research institutes showcase the most advanced European prototypes, products, projects and services.

ERF2018 is not another scientific conference but the one event where roboticists from over 40 countries can network during the social events as well. After its start in San Sebastian in 2010, The European Robotics Forum has become quickly the most popular and influential robotics networking event in Europe.

Conference Materials:

 Projects presentations at the Workshop on Networking for new trends in surgical robotics  
Speaker: Riccardo Muradore, University of Verona, Italy

Gallery:

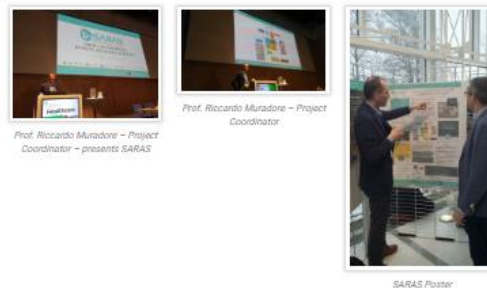


Figure 39 - ERF 2018 Event Page



Figure 40 - ERF 2018 Tweet

### 1.7.4 WORKSHOPS

COSUR 2018: Summer School on Control of Surgical Robots. The main objective of COSUR 2018 is to introduce PhD students and Post-Doctoral fellows to the multidisciplinary research field of surgical robotics, with particular focus on the control algorithms used in robotic surgery and the impact of cognition in directing the control.

Summer School on Control of Surgical Robots (COSUR) 2018  
July 9 - July 13



#### 2nd Biannual Summer School on Control of Surgical Robots (COSUR) 2018

The main objective of COSUR 2018 is to introduce PhD students and Post-Doctoral fellows to the multidisciplinary research field of surgical robotics, with particular focus on the control algorithms used in robotic surgery and the impact of cognition in directing the control.

We will offer lectures, hands-on laboratory experience, and opportunity for informal interaction with clinicians and leading experts from academia and industry.

The school will go beyond the current approach of doctoral schools and will give trainees an in depth understanding of cognition and control in robotic surgery.

#### TECHNICAL PROGRAM

The main themes faced during the school include:

- Control and Sensing in robotic surgery
- Teleoperation and Haptics
- Image-guided robotic surgery and interventions
- Human-Robot Interaction and Cooperation
- Partially autonomous tasks in robotic surgery

Besides the technical aspects, the lecturers of the school will present the medical context in which robotic surgery is being used and the research perspective given by relevant projects.

The school will include tutorial presentations on the technical topics, medical scenarios presented by clinicians, research perspectives given by the coordinators of recently funded projects, and laboratory sessions that will let students apply the concepts introduced during the lectures.

The school will end with a team project, which will be evaluated by the school lecturers. Students will receive a certificate of attendance, to obtain credits in their universities.

Organised by Altair Robotics Lab, in collaboration with the ERC project ARS (Autonomous Robotic Surgery) and the European project SARAS (Smart Autonomous Robotic Assistant Surgeon).

The school is funded by the ARS project, the SARAS projects, the MURAB project, the Doctoral Program in Natural Sciences and Engineering and the Department of Computer Science of the University of Verona.

Figure 41 - COSUR 2018 Event Page

## COSUR 18

SUMMER SCHOOL ON CONTROL OF SURGICAL ROBOTS



9-13 July 2018 | Department of Computer Science | University of Verona, Italy

During the week of 9 to 13 July 2018, 26 attendees and 16 speakers from mostly all continents met in Verona to attend COSUR 2018.

COSUR is at its second edition and it is a biannual Summer School on Control of Surgical Robots organized by ALTair Robotics laboratory in collaboration with the Horizon 2020 projects ARS (Autonomous Robotic Surgery) and SARAS.

The aim of COSUR is to introduce students to the multidisciplinary research field of surgical robotics, with particular focus on the control algorithms used in robotic surgery and the impact of cognition in directing the control.

The school attendees included PhD students and Post-Doctoral fellows with different academic backgrounds and qualifications, from computer science, to engineering and to medicine, and they had the opportunity to learn from well known lecturers and work together at group projects in a nice and friendly atmosphere.

The medical lectures were given by some of the leading specialists in Robotic Surgery, Prof. Franca Meffi - from the Medical School University in Pisa, expert in Thoracic Surgery, Prof. Marco Zenati from Harvard Medical School, pioneer in Cardiac Surgery, Prof. Alberto Arezzo of the University of Torino, endoluminal surgeon, and Prof. Salvatore Siracusano, the leading urologist of the University of Verona.

The technical lectures were given by some of the best-known researchers in Robotic surgery, such as Prof. Alicia Casals from Polytechnic University of Catalonia, Prof. Arianna Mendicassi from Scuola Superiore Sant'Anna and Prof. Philippe Pognet from the University of Montpellier.

The laboratory sessions were focused on teleoperation and machine learning and students worked in small groups to foster collaboration and cross fertilization. The results were presented and evaluated during the last day of school.

In addition to the study program students had the opportunity to discover Verona on a guided tour of the historical center where they experienced the beauty of the city of Romeo and Juliet and moreover enjoyed Italian food at the traditional social dinner.

The school is funded by the ARS project, the SARAS projects, the MURAB project, the Doctoral Program in Natural Sciences and Engineering, the Department of Computer Science of the University of Verona and the Robopsy project.

The next COSUR will take place in 2020.

#### Gallery:



Figure 42 - COSUR 2018 News page

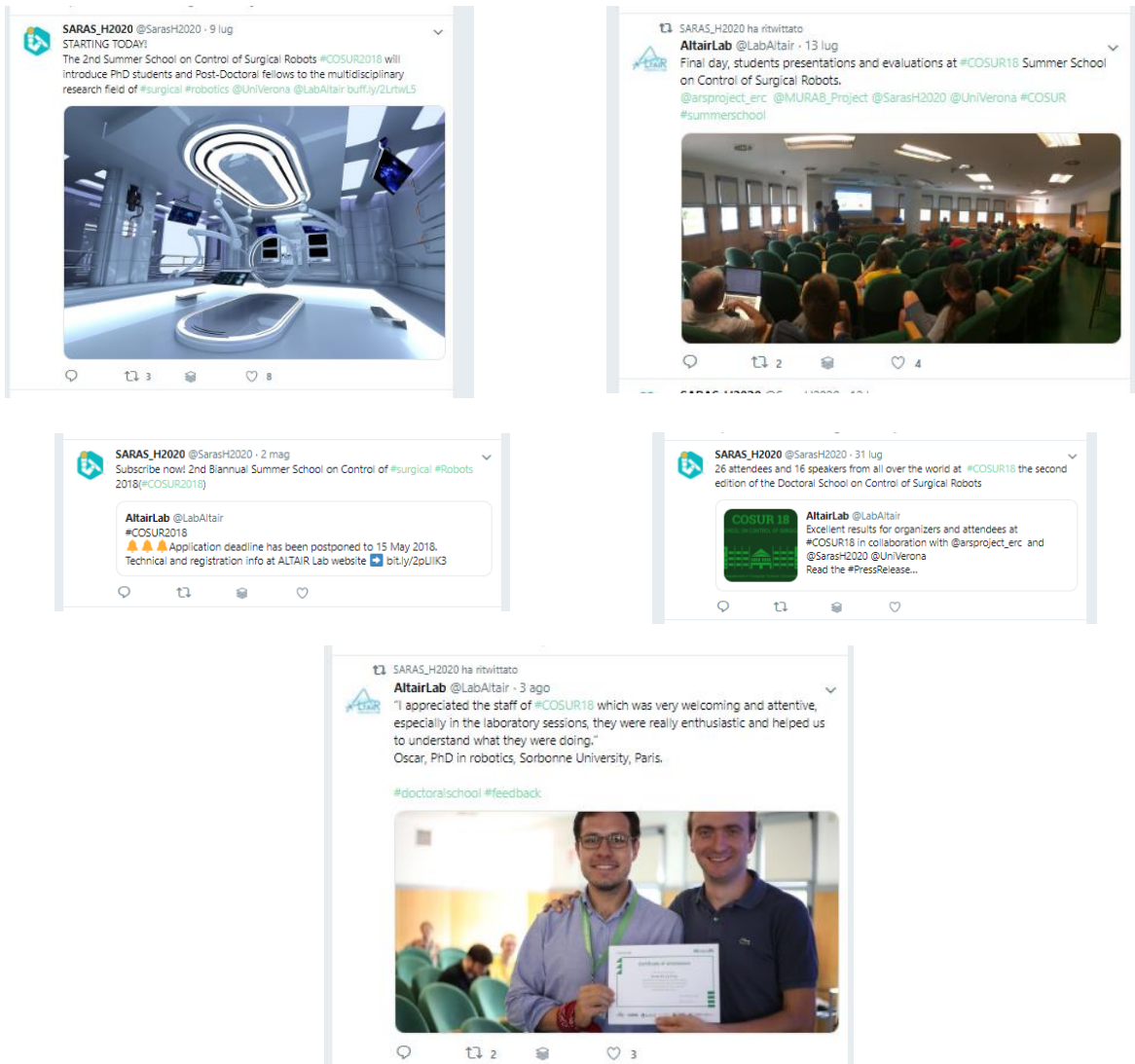


Figure 43 - COSUR 2018 Tweets



MelaTx Workshop - Surgical training held in Sevilla, Spain for Healthcare Experts by UPC.

25 surgeons from all around Spain (10 hospitals from 10 cities) participated in the Course on 7 experimental platforms.

**THE 2ND MelaTX WORKSHOP – Sevilla in June 6-8, 2018**  
 Aug 1, 2018 | Leave a Reply | Uncategorized | assisted surgery, phantoms, Robot, Surgery

UPC participated in the Second MelaTX workshop held in Sevilla in June 6-8, 2018.

UNIVERSITAT POLITÈCNICA DE CATALUNYA (UPC) developed together with surgeons of Hospital Virgen Macarena (Sevilla) and Hospital Clinic (Barcelona) this training platform for the surgical training in the frame of a the workshop 2<sup>nd</sup> MelaTx Workshop.

25 surgeons from all around Spain (10 hospitals from 10 cities) participated in the Course on 7 experimental platforms.

The training platform SENTISIM, combines a physical devices that emulate the human anatomy of the surgical field and the computer support used in real surgery.

This workshop is oriented to the selective biopsy of the sentinel ganglion, but the presence of some representatives of one partner of the Consortium helps our project dissemination, as many surgeons are more and more aware of the potential use of robotics and related technologies for training and assisted surgery.

On top of that, training and supervising platform provides data for analysis of the surgeon sequence of actions.

Albert Hernansanz, Tomás Píeras and Alicia Casals from UPC attended the workshop and participated in the development of the physical phantoms, the sensing and detector device and the software for guidance and as interface for monitoring the surgeons actions.

**Gallery**

More about The Second MelaTX workshop in the news:

**La Vanguardia**  
 Servicio Andaluz de Salud (Consejería de Salud)  
 Redacción Médica  
 EUROPAPRESS

**Follow SARAS on Facebook**

**SARAS project**  
 2 weeks ago

Work in progress: testing SARAS arms positioning! During the test we chose to change the approach of #prostectomy, from Posterior approach carried out in San Raffaele Hospital (@ospedaleSanraffaele) to Anterior approach, easier for phantoms development.

Work in progress: testing phantoms & SARAS arms position – Saras Project saras-project

Work in progress: testing phantoms & SARAS arms position Nov 6, 2018 Leave a Reply

**Follow SARAS on Twitter**

**Tweets by @SarasH2020**

**SARAS\_H2020** @SarasH2020  
 I added a video to a @YouTube playlist [youtu.be/v0b6mooz977a](https://www.youtube.com/watch?v=0b6mooz977a) Incremental Tube Construction for Human Action Detection.

**Tags**

3D object classifier arms assisted surgery Board Chirurgia Copision computer vision Conference Consortium Control Cyber Security ERA2018 Europe event forum hands-on Human-robot-collaboration industry industry 4.0 Kickoff lectures machine vision meeting multidisciplinary Network object cooperation Object recognition partners phantoms PhD students Plans POUIDP Post-Doctoral Productivity Project resources Robot Robotics School

Figure 44 - MelaTX Workshop News Page

**SARAS\_H2020** @SarasH2020 · 1 ago

Developing and analyzing procedures in the use of robotics and related technologies for training and assisted surgery. Thanks to our partner @la\_UPC en el #2MelaTX @HVMacarena

**Universitat Politècnica de Catalunya @la\_UPC**  
 #SENTISIM es un dispositivo híbrido que funciona como plataforma de entrenamiento para cirujanos y que se utiliza con fines educativos y de formación.  
 Ha sido desarrollado por el #CREB #UPC junto con la unidad de ...


5 replies 4 likes

Figure 45 - MelaTX Tweet

### 1.7.5 INTERNAL MEETINGS

SARAS Kick Off Meeting - On January 16 to 17 2018, the SARAS project was officially launched with the Kick off meeting organized in Milan, in the Ospedale San Raffaele.

SARAS Kick off meeting  
January 16 - January 17




On January 16 to 17 2018, the SARAS project was officially launched with the Kick off meeting organized in Milan, in the Ospedale San Raffaele.

This two-day event started with the partners' presentations and description of their role in the project; in the afternoon work packages leaders presented tasks and deliverables of year 1; day one ended with the presentation of the coordinator of the Action plan for year 1.

On day two the Consortium presented Data management plan, Communication, Dissemination and Exploitation plans, appointed Boards' people and discussed about Financial aspects.

During these two days, the partners managed to kick off the project and with great enthusiasm and a strong sense of commitment they shaped and further developed the project strategy for the coming years.

Gallery:



Follow SARAS on Facebook

SARAS project 2 weeks ago

Work in progress: testing SARAS arms positioning! During the test we chose to change the approach of #prostatectomy, from Posterior approach carried out in San Raffaele Hospital @ospedalesanraffaele to Anterior approach, easier for phantom's development.

Work in progress: testing phantoms & SARAS arms position - Saras Project saras-project.eu


Work in progress: testing phantoms & SARAS arms position (Nov 4, 2018) Leave a Reply Meetings, Work in Progress arms.

Follow SARAS on Twitter

Tweets by @SarasH2020

SARAS\_H2020 @SarasH2020

I added a video to a @YouTube playlist yours: [SarasH2020's Incremental Tube Construction for Human Action Detection](#)



Embed View on Twitter

Tags

3D object classifier arms assisted surgery Board

Chirurgia Cognition computer vision

Consortium Conception

Figure 46- SARAS' Kick off Meeting Event Page

SARAS\_H2020 @SarasH2020 · 1 feb

#SARAS\_H2020 project kick-off meeting in #Milan organized by @SanRaffaeleMI !!!




3

3

Figure 47 - KO meeting Tweet

SARAS PROJECT MEETING – The 1st SARAS’ Project Meeting held at UPC at Barcelona in Spain on the 25th and 26th September it was an occasion of networking and sharing.

**PROJECT MEETING M9 – Barcelona in September 25-26, 2018**  
Sep 27, 2018 · Leave a Reply · Meetings · Consortium, meeting, partners

The 1st SARAS' Project Meeting held at UPC at Barcelona in Spain on the 25th and 26th September it was an occasion of **networking and sharing**.

**On the 1st day** the Consortium had the opportunity to discuss about the status of the project, simplified medical procedures, phantoms development, action and speech recognition and quality management.

**On the day two** partners presented SARAS' master console and the slave robot for the assistant surgeon, the SARAS teleoperating architecture, multi-robot navigation, human-robot interaction and force estimation.

Last but not least Partners discussed about **future plans**, communication and dissemination!

The project meeting has also been an occasion for knowing each other and build group cohesiveness.

**Follow SARAS on Facebook**

**SARAS project**  
1 week ago

Work in progress: testing SARAS arms positioning! During the test we chose to change the approach of **#prostatectomy**, from Posterior approach carried out in San Raffaele Hospital @ospedalesanraffaele to Anterior approach, easier for phantom's development.

Work in progress: testing phantoms & SARAS' arms position – Sarash Project saras-project.eu

Work in progress: testing phantoms & SARAS' arms position Nov 6, 2018 · Leave a Reply · Meetings, Work in Progress arms.

**Follow SARAS on Twitter**

Tweets by @Sarash2020

**SARAS\_H2020**  
@Sarash2020

I added a video to a @YouTube playlist [youtu.be/vGtokmcozYo?sa=Incremental Tube Construction for Human Action Detection](https://youtu.be/vGtokmcozYo?sa=Incremental+Tube+Construction+for+Human+Action+Detection)

YouTube @YouTube

Embed View on Twitter

**Tags**

3D object classifier arms assisted surgery Board  
Chirurgia Cognition computer vision

Figure 48 - Project Meeting Event Page



SARAS Testing Meetings - 1st and the 2nd meeting held on the 5th September and the 18th October 2018 at the Department of Computer Science in the University of Verona (Italy).

Work in progress: testing phantoms & SARAS' arms position [Home / Meetings / Work in progress: testing phantoms & SARAS' arms position](#)  
 Saras Project official site

Work in progress: testing phantoms & SARAS' arms position  
 Nov 6, 2018 Leave a Reply Meetings, Work in Progress arms, Consortium, meeting, partners



Work in progress: testing phantom... Riccardo Pittalà Donatelli

In occasion of the 1st and the 2nd meeting held on the 5th September and the 18th October 2018 many progresses have been made at the Department of Computer Science in the University of Verona (Italy).

A small team of experts of the SARAS Consortium have met in Verona to test Prostate's phantom and the positioning of the SARAS arms with respect to the phantom and the da Vinci® arms, together with Doctor Umberto Capitanio, Surgeon and Senior Researcher at the Renal cancer Unit of the Urological Research Institute at the IRCCS Ospedale San Raffaele.



**1. The external phantom box:**

The external phantom box simulates the abdomen and it's composed by a black box, a rigid cage perforated to allow the insertion of the trocars and one or more layer of skin.



**2. The involved organs:**

Dr. Capitanio provided clear instructions to the Austrian Center for Medical Innovation and Technology to realize the most realistic phantoms of the rectum, the bladder, ureters, urethra, prostate and pelvis in terms of dimensions, color and consistency. One contribution of the Doctor is in fact related to the materials used to realise phantoms that must have the same stiffness of real organs.



**3. The other tissues:**

The research center focused on minimally invasive surgical procedures received also clear instructions on how better connect the bladder and the prostate; the quantity of the connective tissue needed and the correct position of ureters and vas deferens. Here we can see the Doctor removing some extra tissue because more pneumoperitoneum is needed in the phantom; the connective tissue should wraps up the bladder and prostate until to half height laterally.



**4. The SARAS arms positioning:**

During our meeting, we chose to change the approach of prostatectomy, from Posterior approach, carried out in San Raffaele Hospital to Anterior approach, it's easier for phantom's development. Trocars has been inserted by the Doctor, but the stiffness of the skin was too hard, so we removed the box of phantom to discuss the position of the da Vinci® arms and then, later, we will study the pneumoperitoneum.

The inclination of 30 degrees will be done outside the phantom and there will be another small inclination of the bone (see Figure below) in order to maximise the operating space. The bone will be raised by the box.

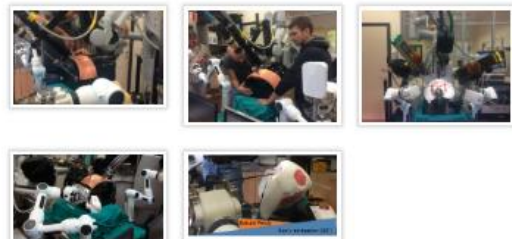


Figure 49 - News section



A video has been edited to summarize the two meeting testing of phantoms & SARAS’ arms position and published in the website – inside the event page, highlighted in the home page and posted on the SARAS’ official YouTube Channel.



Figure 50 - Testing Meeting Video

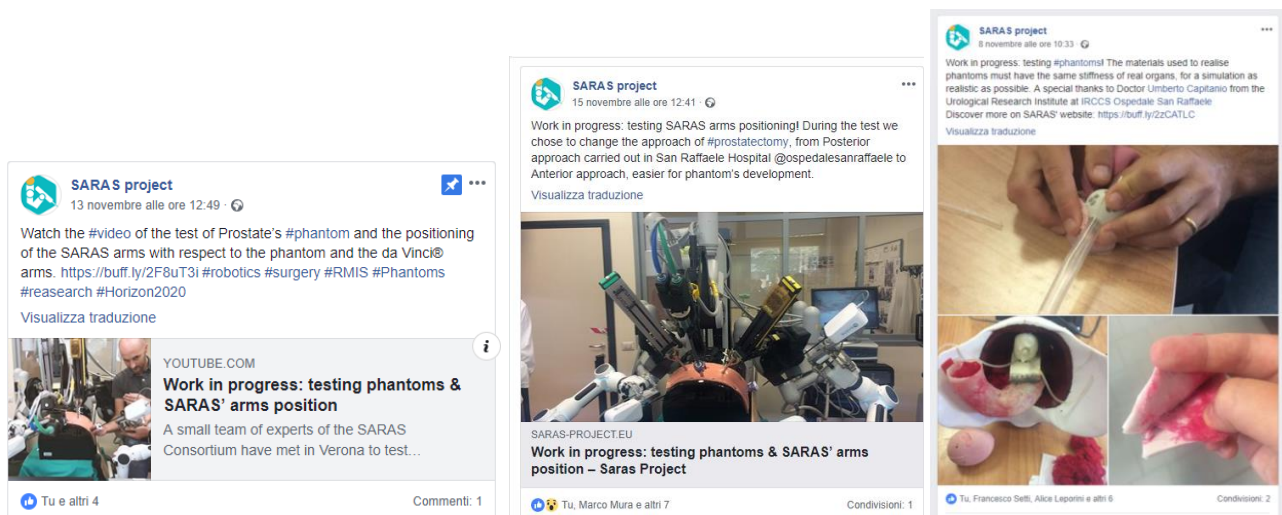


Figure 51 - Meeting posts on Facebook



Figure 52 - Meeting Tweets