



H2020-ICT-25-2016-2017



HYbrid FLying rollIng with-snakE-aRm robot for contact inSpection

HYFLIERS

D7.2

HYFLIERS Dissemination and Exploitation Plan

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Abstract:

This deliverable reports about the dissemination and exploitation plans of the consortium partners.

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Conference. Dissemination. Exploitation. Horizon 2020. HYFLIERS. Innovation. Journal. Magazine. Workshop.

Executive summary

This deliverable reports about the dissemination and exploitation plans of the consortium partners. In particular, relevant dissemination fora are identified together with other dissemination activities the consortium partners will be involved in.

Abbreviations and symbols

EC	European Commission
HYFLIERS	Hybrid flying rolling with-snake-arm robot for contact inspection
ICT	Information and communications technology

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1. Dissemination Plan

The HYFLIERS research results will be disseminated to reach:

- Scientific community
- Industry and end users
- Educational community
- General public

All HYFLIERS project outputs will include a project acknowledgement statement, or otherwise suitable identification means, to help identifying them as originating from the project.

Publications will be written on both the methods and technologies developed during the project and the applications. Scientific publication will be made through high-level international conferences and journals, favouring open-access models. Dissemination will also be promoted in social networks (including LinkedIn, Twitter, etc.), national and local newspapers and television, as relevant. In addition to publications, the consortium also aims at organising international workshops on the research areas related to the project, summer schools, academic courses, seminars and events.

Additional example dissemination means are detailed in the following sections.

1.1. Academic Partners

1.1.1. University of Oulu

UOULU will disseminate HYFLIERS results through publication of scientific articles in journals and at international conferences and workshops. More in particular, the results of the HYFLIERS project will be disseminated as follows

- UOULU website, UOULU social media channels and through them other media such as newspapers and television;
- Scientific papers and posters at conferences and workshops such as
 - European Robotics Forum (ERF);
 - IEEE International Conference on Robotics and Automation (ICRA);
 - IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS);
 - IEEE International Conference on Mechatronics and Automation (ICMA);
 - IEEE International Conference on Automation Science and Engineering (CASE);
 - International Conference on Advanced Robotics (ICAR);
 - Robotics: Science and Systems (RSS);
 - and other journals and conferences;
- Innovation events;
- Internal dissemination within UOULU.

1.1.2. University of Seville

USE will disseminate the project results through publication of scientific papers in journals and at international conferences and workshops. More in particular, the results of the HYFLIERS project will be disseminated as follows:

- USE-GRVC website, USE-GRVC social media channels and through them other media such as newspapers and television;
- Scientific papers at conferences and workshops such as

- IEEE International Conference on Robotics and Automation (ICRA);
 - IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS);
 - International Conference on Unmanned Aircraft Systems (ICUAS);
 - Robotics: Science and Systems (RSS);
 - Iberian Robotics Conferences;
 - and other journals and conferences;
- Workshops at the European Robotics Forum, and in the framework of conferences such as IEEE ICRA and IEEE IROS;
- Summer schools co-organised with other projects;
- Innovation events;
- Internal dissemination within USE.

1.2. Research and Technological Centres

1.2.1. CREATE

CREATE will disseminate the achievements of the HYFLIERS project through scientific publications in journals and at international conferences. CREATE will also participate at international workshops for inspection and maintenance. The achieved results will be disseminated as follows:

- CREATE and University of Naples websites, social media channels;
- National and regional media such as newspapers and television;
 - European Robotics Forum (ERF);
 - IEEE International Conference on Robotics and Automation (ICRA);
 - IEEE International Conference on Mechatronics and Automation (ICMA);
 - IEEE International Conference on Automation Science and Engineering (CASE);
 - International Conference on Advanced Robotics (ICAR), and other journals and conferences.

1.2.2. FADA-CATEC

FADA-CATEC will disseminate the results of the project in the following way:

- FADA-CATEC website: Research & Development → Avionics → Projects
- Sharing some experiments results in social media channels as Twitter
- Workshops, posters and/or short papers at workshops and UAS conferences as
 - UNVEX;
 - ICUAS;
 - ICRA;
 - Etc.

The presentations in scientific events could include oral presentations and posters. It will be general presentation of the project and presentations of particular results. The results of the experiments and the recorded videos will provide important information for these presentations and multimedia publications.

1.3. Industrial Partners

1.3.1. Chevron Oronite

The results of the HYFLIERS project shall be disseminated on the follow platforms:

- Chevron.com website and Chevron social media channels
- Workshops, posters and/or short papers at workshops and industrial conferences
 - ERF;
 - SPE Offshore Europe;
 - SPRINT Robotics Seminar;
 - World Conference NDT;
- Innovation Events, forums and newsletters within Chevron.

1.3.2. Total

The results of the HYFLIERS Project shall be disseminated as follows:

- TOTAL website;
- Workshops and Seminars in TOTAL: all branches (Exploration&Production, Refinery&Chemistry, etc.) and all areas (France, Europe, Worldwide);
- Newsletter in TOTAL;
- Innovation events;
- Presentations/Papers at Conferences (Oil&Gas, NDT, Robotics).

1.3.3. GEIR

The results of the HYFLIERS project shall be disseminated on the following platforms

- GEIR homepage, section “projects” and GEIR social media channels;
- Workshops, posters and/or short papers at workshops and industrial conferences
 - ERF;
 - ECNDT;
 - WCNDT;
 - Minds and Machines;
- Innovation Events, platforms and newsletters within GE;
- application for GE internal innovation awards;
- School and youth programs
 - GE Girls Day – dedicated to promoting female engineers;
 - GE Tech Days – dedicated to growing interest for engineering/technology in schools.

2. Exploitation plan

With the background aim of contributing to strengthen the position of Europe in the field, HYFLIERS will target:

- Provision of HYFLIERS technology to the project’s end user;
- Direct commercial exploitation and licensing of HYFLIERS technology to third parties;
- Generation of spin-off companies;
- Inspiration of new research in robotics;
- Further improvement of academic teaching offer in the field.

Additional example exploitation approaches are detailed in the following sections.

2.1. Academic Partners

2.1.1. University of Oulu

The goal of UOULU in HYFLIERS is to

- Widen their knowledge base;
- Strengthen and expand their teaching offer in specialised courses;
- Activate related academic thesis topics;
- Raise UOULU academic profile;
- Sparkle new research in the field.

Moreover, UOULU will disseminate and promote results in euRobotics and SPARC, and thus feed them to the EC for possible use in future framework programmes.

2.1.2. University of Seville

The goal of USE in HYFLIERS is to

- Widen their knowledge base on the application of aerial robots and aerial manipulators to inspection and maintenance;
- Strengthen and expand their teaching offer in specialised courses;
- Develop doctoral and Master thesis in these topics;
- Raise USE academic profile;

Moreover, USE will disseminate and promote results in euRobotics and SPARC, and thus feed them to the EC for possible use in future framework programmes.

2.2. Research and Technological Centres

2.2.1. CREATE

The goal of CREATE and of University of Naples in HYFLIERS is to

- Widen their knowledge base;
- Activate related academic thesis topics;
- Fertilize the birth of new spin-offs
- Sparkle new research in the field.

2.2.2. FADA-CATEC

The main objective of FADA-CATEC is transferring technology to companies that will market them. Therefore, it is expected that some of the technologies developed in this project, and that will be demonstrated in a realistic scenario, will be of interest of the UAS/robotics industry. Then, the exploitation scheme will be based on licensing the technology for its industrialization and production.

2.3. Industrial Partners

2.3.1. GEIR

The goal if GEIR in HYFLIERS is to expand its product and technology portfolio.

The Crawler prototypes and technologies developed during the HYFLIERS can be – depending on the outcomes - exploited as follows

- Stepwise industrialisation of the crawler system within the hybrid robot, most likely by transfer to a HYFLIERS spin-off who is interested in the overall hybrid robotic system
- Industrialisation of the ground crawler itself to a light-weight and flexible inspection crawler. As this crawler does not have to carry the significant payload induced by the HYFLIERS scope (aerial system, UT system, arm, controller, battery), it seems absolutely feasible to extend the scope significantly towards “Should” and even “Could” requirements of the operators in the HYFLIER consortium (TOTAL, CHEVRON). This could be
 - min tube diameters 6” or even lower
 - fast inspection of elbows, min. diameters to be evaluated
 - flexible inspection of further element, such as T-joints and reducers
- Use of the technology know-how gained in the HYFLIERS project, e.g. light-weight industrial design in other project and products of GEIR, e.g. BIKE, FAST or TRIC System
- integration of elements developed by other partners into GEIR products, such as
 - light weight arm
 - circular arm
 - light weight UT system
 - miniature UT probe incl. coupling system

Appendix

Here below are reported the slides for the WP7 presentation given during the kick-off meeting.



HYFLIERS WP7 DISSEMINATION and EXPLOITATION

Stephane CORBINEAU - Kris KYDD, TOTAL
Anibal OLLERO, USE
Kick-off meeting,
Oulu, 10-11 Jan 2018



Dissemination (WP7-Task 7.1)



- Target Communities and define objectives for each one:
 - Industry (End Users) – Scientific – Educational – General Public
- Identify communication channels:
 - Publication in journals
 - Presentation in conferences, Workshop in forum
 - Communication in Seminars (Companies, Universities...)
 - Innovation awards
 - Media (TV, radio, newspapers, social networks...)
 - HYFLIERS website (internal site / external site)
- Prepare supports for communication (posters, videos...)
- Develop communication plan in accordance with targets



Dissemination (WP7-Task 7.1)



• Communication channels:

Conference	Seminar, Forum	Media
<p>OIL & GAS:</p> <ul style="list-style-type: none"> • ADIPEC (Abu-Dhabi) • OTC (USA, Asia)... <p>ROBOTICS:</p> <ul style="list-style-type: none"> • Sprint Robotics • ICRA • IROS... <p>INSPECTION / INTEGRITY:</p> <ul style="list-style-type: none"> • NACE, API (USA)... 	<p>SEMINARS:</p> <ul style="list-style-type: none"> • End User Seminars • University Seminars • ... <p>FORUMS, WORKSHOPS:</p> <ul style="list-style-type: none"> • European Robotics Forum • euRobotics maint & insp topic group • IEEE Aerial Robotics • Unmanned Aerial Vehicle Technical Committee... 	<ul style="list-style-type: none"> • HYFLIERS website (int/ext) • Social networks • Newspapers • TV, Radio • Journals • IEE RAM • ...

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Task 7.1: Dissemination and Education



• Dissemination in four communities

- Scientific
- Industry:
 - equipment manufacturers,
 - service providers,
 - end-users
- Educational
 - University
 - Others ?
- General public

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Task 7.1: Dissemination and Education



• Dissemination tools

- Papers in conferences and journals
- Articles in specialized media
 - Sectors: oil and gas, aerospace, UAS/RPAS..... ?
 - Companies: Chevron, Total
- Workshops
 - Robotics and Inspection Conferences: ERF, IEEE ICRA, IEEE IROS, ???
 - With other projects, i.e. AEOARMS, AEROBI,
 - Hyflers Workshops, in connection with general meetings
- Summer schools, jointly with other projects, i.e. AEROARMS
- University invited talks
- University regular courses, Master courses
- Interviews: Press, Radio, TV
- Others ?
- **Social Nets: How to deal with ?**

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Task 7.1: Dissemination and Education



• First actions (1)

- Participation in the ERF 2018 Workshop (2 slots, 3h)
 "Aerial Robotic Inspection and Maintenance: industrial demands, technologies and existing barriers"
 Tempere (Finland), March 13, 2018
 Organizers: Anibal Ollero, Mauricio Calva, Ekkehard Zwicker
 Topic Groups: Aerial Robotics, Inspection and Maintenance
 Will include the presentations:
 - "Inspection of Large Storage Tanks using Robotic Systems in Oil Refineries", **Mauricio Calva** (Chevron)
 - "Aerial Robotics in industrial use for inspection, maintenance and transportation: industrial demands, technologies and existing barriers", **Ekkehard, Zwicker** (General Electric Inspection Robotics)
 - "Technologies for aerial robotic industrial inspection, maintenance and transportation", **Anibal Ollero** (Universidad de Sevilla)
 - "HYbrid FLYing rollIng with snake aRm robot for contact inSpection: The HYFLIERS H2020 project", **Juha Röning** (University of Oulu)

Invitations to companies and academia

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Task 7.1: Dissemination and Education



- **First actions (2)**

- ICRA 2018 (<http://icra2018.org/>) Full day Workshop
"Aerial Robotic Inspection and Maintenance: Research Challenges,
Field Experience and Industry Needs"
Brisbane, Australia – May 21st or 25th: Workshop (full-day)
<http://www.aerial-inspection-maintenance.com/>

Organizers: Kostas Alexis (University of Nevada, USA), **Gianluca Antonelli** (Università di Cassino Italy), **Mauricio Calva**, (Chevron, UK), Margarita Chli, (ETH Zurich, CH), Matteo Fumagalli (Univ. Copenhagen, DK), **Anibal Ollero** (University of Seville, ES).

Supported by:

IEEE RAS TC 1 Aerial Robotics and Unmanned Aerial Vehicles

EU projects: EU-projects AEROARMS, AEROBI, **HYFLIERS**, AEROWORKS

Important Dates

Poster abstract submission: **March 19, 2018 (AoE).**

Notification of acceptance: **April 19, 2018 (AoE).**

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Task 7.1: Dissemination and Education



- **First actions (3)**

- Joint summer school IEEE TC MRS and Aerial Robotics
Organized by University of Seville and FADA-CATEC
October 2018 in connection with IROS 2018 (Madrid)
- Interview Juha Röning and Anibal Ollero, Kaleva (January 9, 2018)

**Other proposed actions: IEEE RAM Special Issue Oil and Gas
Social Network activities ?
Problem with reporting**

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Task 7.1: Dissemination and Education



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Exploitation (WP7-Task 7.2)



- It is essential to clarify the **Business Model** and **Actors**

Insp Tools Provider

- Design/Manufacturing of tool industrial version from prototype
- Accreditation/Registration by National Civil Aviation Authority
- Maintenance Services
- Training Services
- Marketing & Commercialisation

PACKAGE:
(Tool+Maintenance+Training+Doc)

Insp Services Provider

- Tool/Drone operation
- Pilots qualification
- Risk assessment (with End User)
- Documentation (flight plan, procedures, authorizations...)
- Performance of insp. operations
- Reporting

End Users

- Asset owners
- Oil&Gas Ind.
- ...

Alternative:
some end users
may decide to buy
& operate the tool
on their assets.

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Exploitation (WP7-Task 7.2)



- A **Commercialisation Agreement** between co-owners shall be in place before the end of HYFLIERS Project.
- Conditions for commercialisation shall be clarified:
 - Commercialisation License granted to 1/several co-owner(s)?
→ compensation for other co-owners (fee or royalties).
 - ...
- Specific conditions to be considered for Partners / End Users
 - Exclusivity period?
 - Discount for tool procurement?, for inspection services?
 - free License for utilisation on their assets?
 - Priority for operations on their assets (upon concurrent requests)?
 - ...

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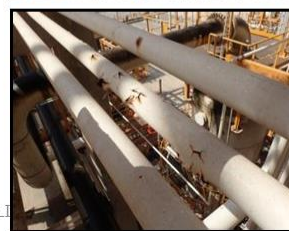
Exploitation (WP7-Task 7.2)



- Some typical applications for HYFLIERS:
 - Oil&Gas industry: Onshore assets, Refineries, Chemical Plants...
 - Piperacks, Piping connected to Pressure Vessels...



- Main limitations:
 - Insulation, External corrosion
 - Congested areas
 - Risk of explosion...



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Exploitation (WP7-Task 7.2)



- **Risk Assessment** shall be addressed in HYFLIERS Project
- Risks related to the tools operations may lead to strong constraints and limitations for exploitation, in particular:
 - Explosion (non-ATEX tools => hot work permit, gas detection, automatic shutdown, safe evacuation, battery protection...)
 - Collision (congested areas, simultaneous operations, detection of foreign object...)
 - Drop object (risk for personnel, for equipment)
 - Loss of communication, loss of control...
- These risks shall be properly evaluated and mitigated. The Risk Assessment will contribute to demonstrate the safe use of HYFLIERS tools with adequate mitigations
 - RA included in WP6 - Task Leader: Chevron with input from others