Kick-Off meeting
OP/1/2018

Department C: Operations / Unit C.3

Lisbon / 06 November 2018
EMSA’s Tasks in the Maritime domain

Assist the Commission

Work with Member States

Cooperation MSs-COM- EFCA-FRONTEX

- Traffic Monitoring (SSN)
- IMS Integrated maritime Surveillance
- CleanSeaNet
- Copernicus maritime Surveillance Services
- SLAs FRONTEX /EFCA/EMSA
EU Maritime Challenges

- Safety of Navigation
  - Traffic separation schemes
  - Search and Rescue (SAR)
  - Ship-to-ship transfers
  - Maritime accidents and disasters
- Logistics and Customs
- Pollution:
  - Oil Spills
  - Air Emissions (Sox)
- Security and threat of terrorism
- Piracy and armed robbery
- Migration and people trafficking
- Trafficking of contraband, weapons, and narcotics
- Fishing:
  - Illegal, Unreported, Unregulated
Bridging the gap …

Remotely Piloted Aircraft Systems

- Limited range
- Limited Availability
- RPAS to complement maritime surveillance
- EMSA integrated maritime services
  - Common interface
  - Maritime picture
  - Data fusion
Integration of data...

BRLOS – SATCOM

Data processing

Emissions monitoring
Anti Piracy
Fishery control
Search and rescue
Border control
Trafficking

User communities

Oil spill response

Distress AIS
Radar, IR, optical

real time

EMSA RPAS-DC

integrated services:
• mapping of data
• alerting
Key principles of operations

- RPAS operations shall serve Member States, EU Agencies, and Commission
- **RPAS services will only be provided based on a Member State request**
- **Services will be free of charge for MSs**
  - Member State authorities shall be owner of operation
  - Operations will be adapted to user needs
  - Member State authorities to decide “what to do”
  - Each deployment expected to be min. 2-3 months.

User responsibilities
- To support request for permit to fly from relevant aviation authority.
- To provide the airstrip (take-off/landing) and logistics
Satellite Communication

- Beyond Radio Line of Sight (BRLOS) – satellite communication is required to allow far range and to cover large areas
- Communication links: C2 (Command and Control) + Payload data
- Horizontally provided to all RPAS services via multiple satellite
- New business model: data consumption fee instead of bandwidth subscription
- High speed: up to 9 Mbit/s

Communication RPAS to ground

Communication ground to ground

BRLOS – SATCOM

RLOS

over water

Ground station

Internet

VSAT

RPAS-DC Server

EMSA
Key Characteristics and Requirements

- Availability High (24/7)
- Day / night operations
- Long endurance to cover large sea areas
- Wide range (Beyond Radio Line of Sight - BRLOS)
- Resistant to: strong winds, extreme temperature/ humidity
- Rapid on site launch
- Small take-off footprint (Runway, Catapult, VTOL)
- Operation on vessels (VTOL, Catapult)
- Operating in potentially dangerous environments (which is not possible with a pilot)
- Safety: e.g. Aviation Transponder

- DRI (during day and night) with EO, IR and Radar
  - Detection: Discovery of vessels of from 50 km distance
  - Recognition: Identification of the ship type from 20 km distance
  - Identification: Reading a ship-name, Counting the people on board, Distinction of human activities
- Environmental sensors, AIS, EPIRB
- Real time data availability
Enclosed to Invitation to tender for procurement procedure No. EMSA/OP/1/2018 concerning Contract for long endurance and long range RPAS

In case of Individual submission

Name of the company
CEIIA – Centro de Engenharia e Desenvolvimento (Associação)

In case of Joint offer

Name of grouping (if applicable)

Names of the partners
-
-

Contact person

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E-mail: ceii@ceii.com
Fax:

Date & Signature:

Done at Matosinhos, on May 10th 2018
Signature of the authorised representative:

Hermes® 900 UAS
Technical Description

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General timing
RPAS Service Overview

1. **User requests Service**
   - FORM001 Initial Service Request Signed user → EMSA
   - RPAS Portfolio EMSA → user
   - FORM002 RPAS Detailed Operational Service Request user → EMSA

2. **Definition of the Deployment**
   - Mobilisation Notice EMSA → user
   - Mobilisation Alert EMSA → RPAS contractor

3. **Site survey**
   - Permit to Fly obtained by RPAS contractor (and other authorisations)
   - Contract signature EMSA/Contractor for the mobilisation, on-site activities and missions

4. **Permit to Fly**
   - RPAS operational procedures for coordination EMSA, user, RPAS contractor
   - 30 days minimum

5. **Set-up**
   - RPAS contractor mobilisation
   - 2 weeks maximum

6. **Operations**
   - Missions
   - Weekly Flight Schedules user → RPAS contractor
   - Weekly Flight Reports RPAS contractor → user, EMSA
   - De-mobilisation Notice signed user → EMSA

7. **End of the Service**
   - De-mobilisation Notice EMSA → user
Timings for various modules

Module 1: Mobilisation Alert, Preparation
Module 2: Transport, On-site setup
Module 3: On-site activities
Module 4: Flight operations

Deployment 1
Overlap possible
Deployment n
Contract structure
Contract introduction

**Objective: Maritime Surveillance**

- Multi-purpose activity
- Maritime Safety (incl. S&R, Maritime pollution)
- Maritime Security (border control)
- Fishery Control
- Vessel surveillance and identification
- Behaviour monitoring

**Framework contract**

- Procedure to order services
- Sets out Provisions applied to services
- Obligations of Parties
- Duration: 2 Years + up to 2 renewals of 12 months
FWC implemented by Specific Contracts

• Services divided in Specific Contracts:

  ✓ Service Set-up (Module 1)
  ✓ Operations (Module 2-4: Mobilisation, on-site activities, missions)
  ✓ Additional SC for Interfacing (Module 5)
User service request defines deployment

One SC for each deployment
**EMSA EXPECTATIONS: 3 MAIN PILLARS**

**Pillar 1: RPAS Capabilities/Performances**

All requirements in EMSA/OP/1/2018 fulfilled on time

- RPA performances
- Payload & Sensors
- Communications
  - C2
  - Payloads
  - ATC
- Staff/Operators
Contract introduction

EMSA EXPECTATIONS: 3 MAIN PILLARS

**Pillar 2: Service Reliability**

- No service interruption/delays due to tech/human failures
  - Operator training
  - Acceptance test/flight
  - Change management/Configuration control
  - Operations/Maintenance procedures
- Worst case scenario: Loss/crash of RPA
Contract introduction

EMSA EXPECTATIONS: 3 MAIN PILLARS

Pillar 3: Data Exploitation/Visualisation

• User orientated:
  • A complete maritime picture
  • Direct user decision-making
• Flexible
• User friendly
• Secure and reliable
• **Service Set-up:** fixed fee
  ✓ One payment at end of the set-up
  ✓ Conditional on acceptance for start of operations
Payments (2) – Module 2 - 4

- **Transport**: fixed fee
  - ✓ Included in quarterly invoice (also with any on-site costs and FHs)

- **On-site activities**: minimum 3 months
  - ✓ Included in quarterly invoice (incl. mobilisation)
    - On-site costs: staff, insurance, operations, maintenance-based on calendar days
    - Flight hours - Only performed FHs paid

- Quarterly payment based on mobilisation and service report (and if FHs not flown non-flight report)
Contract introduction

Payments (3)

- **Interfacing**: fixed fee at end of work
  - One payment at end of work
  - Based on report indicating what has been done and acceptance of interfacing based on tests
  - Partial acceptance possible
Email: RPAS@emsa.europa.eu

• We will receive all requests from Member States, Agencies, questions on our service etc.
• To be used by MS/Agencies and EMSA
Contract introduction

EMSA FOLLOW-UP (2)

Email: RPAS_operations@emsa.europa.eu

- All discussions on a particular operation. For example:
  - Denmark emissions monitoring operation for next 3 months
  - Operational procedures
- To be used by MS/Agencies, EMSA and contractors
Email: RPAS_contracts@emsa.europa.eu

- All questions for contractors providing RPAS service including contractual issues, payments, details on how we start a service, any contract management issues.
- To be used by MS/Agencies, EMSA and contractors
ALL EMAILS

• To include OP1/2018 and/or CEIIA in the subject.
<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
<th>Email: <a href="mailto:xxx@emsa.europa.eu">xxx@emsa.europa.eu</a></th>
<th>Phone</th>
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<td>+351 21 1209 244</td>
</tr>
</tbody>
</table>

however all emailing should be done through the 3 main email boxes
Email needed for user account:

- Tasks
- Minutes from Conference Calls
- Ongoing actions
- All Tender documentation including deliverables
- RPAS documentation
- Etc.
Timeplan
<table>
<thead>
<tr>
<th>Event/Delivery</th>
<th>Date</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>T0</strong> Contract Award letter is sent to the successful tenderer **</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>T1</strong> Initial Configuration test: Successful Live Flight Demonstration of the RPAS configuration offered by the successful tenderer</td>
<td>T0+45 days</td>
<td>At tenderer's premises or other chosen location by the successful tenderer. Refer to section 6.1 of Appendix 1: Technical Specifications. Refer to Appendix 2: Initial configuration evaluation.</td>
</tr>
<tr>
<td><strong>T2</strong> Signature of the framework contract after successful test of the offered configuration &amp; Signature of Mod. 5: Interfacing specific contract</td>
<td>T0+8 weeks; Estimated 10 September 2018</td>
<td></td>
</tr>
<tr>
<td><strong>T3</strong> Kick-off meeting (KOM) **</td>
<td>T2+1 week max</td>
<td>KOM at EMSA premises in Lisbon</td>
</tr>
<tr>
<td><strong>T4</strong> Update of the project plan, Delivery of capability test plan, Delivery of first draft of RPAS Passport **</td>
<td>T2+1 week max</td>
<td>Refer to section 9.2, section 6.2 and section 5 of Appendix 1: Technical Specifications.</td>
</tr>
<tr>
<td><strong>T5</strong> Delivery of documentation **</td>
<td>To be agreed at KOM, Max T2+3 weeks</td>
<td>Including all documents listed under section 5, section 6 and section 9 of Appendix 1: Technical Specifications.</td>
</tr>
<tr>
<td><strong>T6</strong> Delivery of Module 5 service (interfacing) **</td>
<td>T2+6 months</td>
<td></td>
</tr>
</tbody>
</table>
| T7  | Mobilisation, alert and signature of the specific contract for Mod.1 for deployment 1
|     | T2+1 week (tentative) 
|     | It is the intention to sign the first Mod.1 Mobilisation Alert and Preparation specific contract immediately after T2, as soon as a user formalises a deployment request that corresponds to the capabilities of the contract.
| T8  | Signature of first specific contract for Mod.2, Mod.3 and Mod.4 for deployment 1
|     | After completion of T7
|     | The permit to fly must be available before the specific contract is signed for the specific deployment.
| T9  | Capability tests on first deployment site
|     | T8+2 weeks
|     | Contractor must be mobilized and on-site ready to fly.
|     | Refer to section 6.2 Appendix 1 Technical Specifications.
| T10 | Start of flight operations/missions for the first deployment
|     | T9+2 days (tentative)
<table>
<thead>
<tr>
<th></th>
<th>Following Deployments N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>T11</strong></td>
<td>Deployment N (T7, T8 and T10)</td>
</tr>
<tr>
<td><strong>T12</strong></td>
<td>Possible extension for an additional year at EMSA request.</td>
</tr>
<tr>
<td><strong>T13</strong></td>
<td>Possible extension for a second additional year at EMSA request.</td>
</tr>
<tr>
<td><strong>T14</strong></td>
<td>Maximum End date of Framework Contract</td>
</tr>
</tbody>
</table>
5 Documentation

5.1.1.1 The contractor has to provide the documentation necessary to achieve the Permit-to-fly from the national aviation authorities and/or from EASA during the module 1 activities. This includes the documentation for air worthiness and air traffic management.

5.1.1.2 In order to facilitate, standardise and speed-up the process of achieving the permit to fly, a detailed table of contents of the documentation to be delivered is given in Enclosure 3 to this document\textsuperscript{15}, called “RPAS passport”. The contractor can either structure its documentation according to this table of contents or he is requested to provide a mapping table identifying in detail (document, chapter, page), where this information can be found in the company documentation provided.

5.1.1.3 For the planning of each deployment/operation the following documentation has to be provided by the contractor:

- **RPAS portfolio for requesting users** (summary document on the RPAS characteristics and on-site requirements)
- **Operational Procedures** on-site
6.2 Capability tests (in situ for each deployment)

6.2.1.1 At the beginning of each deployment, before the start of operations (module 3) ground and flight tests shall take place at the deployment site with the presence of representatives of the user and of EMSA in order to assess and document if the capabilities as offered and requested for the specific operation are available for the deployment.

6.2.1.2 Before the initial capability test, the following documents have to be provided by contractor:

- Capability Test plan including the description of the test cases in-line with the test guidelines provided by EMSA in enclosure 1 to this document.\textsuperscript{16}
- Test Readiness Review for the Capability Test, which shows that the pre-tests performed by the contractor have been successful
9.2  **Project Management Plan**

9.2.1.1 The project will require the highest standards of project and operational management.

9.2.1.2 The **Project Management Plan** for the implementation of the whole contract shall be provided for the bid and updated by the contractor as needed and shall contain the following elements:

- Work breakdown structure;
- Proposed team composition and organisation: including the involvement and interaction of each team member within the different modules of the FWC including within a deployment. The proposed staff training plan shall also be described including pilots, operators and other experts;
- Risk Assessment: identification of risks including their severity and likelihood;

9.2.1.3 For the preparation phase the Project Management Plan the contractor shall also include:

- Work Packages identifying inputs, outputs, list of tasks and staff involved;
- Gantt chart defining the project timeline including milestones, meetings and deliverables;
9.5 Quality Management Plan

9.5.1.1 The contractor shall apply a stringent quality management which includes specific quality related measures to be followed during the lifetime of the contract (i.e. ISO certification, etc.).
Module 1
Module 1: Set-up

Set-up objective: System ready for deployment

Four main tasks:

• Site survey
• Permit to fly
• Deployment plan
• Capability test plan
Module 1: Set-up

**Description**

- Set-up activities are covered by Specific Contract for Module 1
  - Triggered by an end user request (Form 2)
  - Starting with the mobilisation alert and the signature of SC
  - Duration: approx. 1 Month
  - Ending when the 4 tasks are fulfilled: usually the PtF

**Remark**

EMSA intention is to mobilised CEiia immediately
Module 1: Set-up

**Site survey:** as soon as the end user can accommodate it. Selection of potential deployment site based on Ceiia Portfolio. It usually requires 2-3 days plus the trip

1. **Detailed operation definition** with the end user: areas, OoI, FHs, communications, roles, data dissemination etc.

2. **Safety:** ATC procedures, airspace class, coordination with other traffic, limits, type of operation (state op vs EASA) and permit to fly process

3. **Logistics:** visit potential aerodromes/airports (runway, other traffic, hangar, antenna location, storage areas etc.) and check the accommodation and other services in the area
Module 1: Set-up

Permit to fly:

- First step is to define the aviation authority in charge (EASA vs State operation)
- Delivery of the RPASPASSPORT
- Specific procedures in each country: it will be required to adapt the documentation submitted to specific requirements
- It is an iterative process: mandatory to allocate resources in order to be supportive and reactive
Module 1: Set-up

Deployment plan:

• Based on the information collected during the site survey
• It must include at least:
  • Transport and on-site activities time plan
  • Crew including the deployment manager and mission chief
  • Shifts/rotation plan
  • Assets and spare parts
  • Training program (if needed)
  • Contingency plans
Module 1: Set-up

Mandatory configuration & performances to be validated

1. Performance/capabilities to be validated/accepted with the configuration above through dedicated tests

Endurance: > 18 hours (to be discussed)
Range: indefinite (BRLOS); limited by endurance
Cruise speed: 180 km/h
All operational modes (patterns, loiter, tracking etc.)
Day and Night operations
Handling data from all sensors
Safety procedures (handover, loss of link etc.)
Module 1: Set-up

Mandatory configuration & performances to be validated

2. Configuration:
All these sensors/equipment must be integrated simultaneously and in compliance with the performances stated in the offer.

- Gimbal with EO, IR illuminator
- Maritime Radar/SAR with high resolution and sensitivity
- AIS Transponder, Distress sensor,
- Transponder
- RLOS subsystem
- BRLOS subsystem
Module 1: Radar

Mandatory configuration & performances to be validated

3. Radar sensor:

Requirements

<table>
<thead>
<tr>
<th>Maritime radar</th>
<th>360° coverage with multimode capabilities:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maritime modes:</td>
</tr>
<tr>
<td></td>
<td>- Detection and tracking of vessels according to the long range detection capabilities given above</td>
</tr>
<tr>
<td></td>
<td>- Detection and localization of aircraft</td>
</tr>
<tr>
<td></td>
<td>- Detection and localization of rainy zones</td>
</tr>
<tr>
<td></td>
<td>- Interrogation/Detection of Search and Rescue beacons</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mandatory</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Radar in Synthetic aperture radar (SAR) mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>(could be a combined device with the maritime radar)</td>
</tr>
</tbody>
</table>

- X or C band
- Preferably 360 degree sweeps or otherwise each side of the aircraft
- With detection and recognition capability of oil on water, wakes and vessels

Available modes:
- ScanSAR
- SpotSAR

<table>
<thead>
<tr>
<th></th>
<th>Mandatory</th>
</tr>
</thead>
<tbody>
<tr>
<td>With a max. resolution of 1 m</td>
<td></td>
</tr>
<tr>
<td>With a max. resolution of &lt; 50 cm</td>
<td>Advantage</td>
</tr>
<tr>
<td>Range (one direction) of 20 km</td>
<td>Mandatory</td>
</tr>
<tr>
<td>A range (one direction) of more than 40km is a key advantage.</td>
<td>Advantage</td>
</tr>
</tbody>
</table>
Module 1: Configuration management

Elements to be addressed by the configuration management (per aircraft!)

- Unique type identifier including RPA of core elements
- Technical specification per unique part
- Change requests / approval (incl. EMSA) / implementation processes
  - Documentation of the changes
  - Reasoning and advantages
  - Implications on the RPAS
  - Security concerns
- Consisting referencing and numbering (document identifiers, pages, titles, ...)
- Version control
Module 1: Capability tests (in situ for each deployment)

• Before the start of operations (module 3) at the deployment site
• Before the initial capability test, the following documents have to be provided by contractor:
  • Capability Test plan including the description of the test cases
  • Test Readiness Review for the Capability Test
• First capability test will be concluded with an evaluation of the operational service capabilities
• Additional capability tests in case of change of configuration may be performed as necessary.
• **Article I.15 of the framework contract applies in case the contractor does not fully provide the requested and offered operational capabilities.**
Needed to operate the aircraft !!!

Has to be requested for each operation

Main items to be considered:

• Safety procedures available and complete
• Segregated/non-segregated airspace
• Controlled/non-controlled airspace
• Operational areas always over seas
• Take-off from airfields close to the coast
• Over-land restricted corridors to reach the Operational area
• BRLOS and RLOS flights (Communications channels)
• Day and night flights
Permit to fly – the process

Obtaining permit to fly (PtF)

- It is with the RPAS service provider/operator to officially request the PtF
- Lengthy process because RPAS are not certified – requires legislation
- Risk based vs. airworthiness approach should be applied to accelerate

EMSAs role

- Facilitating the process between the parties (users, service providers)
- Requesting and enforcing the operators to provide the relevant documentation to the aviation authority

Achievements

- PtF’s were expressed for “Experimental” or “State” operations
- PtF’s were already obtained from Portugal, Spain, Denmark, Greece, Croatia
Air traffic management

The PtF is not enough …

- NOTAM (Notice to Airman) needed for airspace segregation

Segregated airspace

- Unsegregated airspace with the present legislation not possible to achieve
- Fixed segregated airspace vs. dynamically allocated segregation
Air traffic management

• Route
• Flight Plan Information
• Transponder Code Assignment
• Frequency Assignments
• Transfer Control Points
• Separation and Distances

Procedures
• Transit
• Cross border

Contingency Procedures
• Radio Failure
• Loss of Control datalink
• Emergency Descent (Ditching /Emergency Landing) Points
• Emergency / Contingency landing sites
RPAS Passport

Documentation

• Documentation necessary to achieve the **Permit-to-fly** from the NAA and/or from EASA during the module 1 activities.

• This includes the documentation for air worthiness and air traffic management.

**To harmonise documentation → RPAS Passport**

To streamline the process to get a Permit to fly

• Structure the documentation according the table

  Or

• Provide a mapping table identifying in detail where the information can be found.
RPAS Passport

- RPAS contractor overview
- RPAS description
- RPAS configuration
- Operations Manual
- RPAS flight manual
- RPAS on-site logistical requirements
- RPAS maintenance manual
- RPAS Technical logbook
- Operational risk assessment and mitigation plan
- Generic safety case
- Quality assurance plan
- Others: Previous permits to fly or certificates, RPAS operation authorised personnel certificates
Tender Specifications

• RPAS Passport Draft submitted in the bid
• Update of RPAS Passport.
  • Configuration offered in the bid.
  • i.e: IPC- Illustrated Parts Catalogue not provided.
    COMERCIAL SENSITIVE INFORMATION> reference of the document as first step.
• Expected delivery time
• Update the document with the type of Documents provided to Switzerland
Satellite communication
SATCOM Objective: SATCOM capacity-provision and capacity-management services to support the Agency’s RPAS BRLOS operations

- **Lot 1 SATCOM services (≥2Mbps):** SATCOM capacity for BRLOS communications with a minimum data rate of 2Mbps in the return link.
- **Lot 2 SATCOM services (≥5Mbps):** SATCOM capacity for BRLOS communications with a minimum data rate of 5Mbps in the return link.

The contracted satellite capacity shall allow the transmission of several simultaneous payload data sensor streams (EO cameras, IR, radar, etc.), housekeeping and metadata information and Command and Control link.

- **Lot 3 Satellite Internet Service:** intended to provide internet via satellite to connect the LGCS with the CGCS and/or the RPAS-DC.

The contracts awarded per lot are Framework Contracts (FWC) in cascade valid for two years with twice the possibility of a renewal.

Specific Contracts (SCs) will be activated for provision of SATCOM and/or satellite internet services for RPAS operations deployments.

Specific Contracts (SCs) will be awarded subject to the following conditions:

- availability of a compatible SATCOM terminal on-board of the RPAS or ready to be fitted to the RPAS platform with a minimum installation and configuration effort
- Sufficient coverage of AoI (Area of Interest)
**Satellite link**
- For each request, the Satellite Service Provider will analyze the area of operations, SATCOM terminal characteristics and QoS requirements.
- The best capacity available in the Service Provider’s fleet in order to provide a connectivity solution.

**Teleport solution, VPN and Internet gateway**
- Hub modem compatible with the modem on-board of the RPAS
- The satellite service providers would request to know the RPAS terminals and modems used by RPAS operators after FWC signature, in order to be prepared to respond to the requests

**Service maintenance**
- RPAS terminal and modem is not part of the solution but if requested OP/2/2018 Contractors are committed to provide a terminal and modem (purchase or leasing) to the RPAS Service Provider in order to enable the use of the connectivity solution.
Coverage: Ku_band and Ka_band

- Portfolio of more than 12 satellites
- Ku_band, Ka_band, military Ka_band
- Coverage of all geographical AoI (Areas of Interest)
List of compatible terminals

- Astronics Aerosat: F-210 F-310, F-410 and F-510, T-210
- Panasonic - LE
- General Dynamics: M17-17A, M20-20, M17-17LP
- GetSAT: MicroSat, MiliSat
- Rantec: 18-inch and 11-inch
- Raysat (Gilat): BlackRay, Stealth Ray’s and Eagle Ray’s
- SkyTec: BBIG45Ku
- Space Engineering S.p.A.: Janus Aero
- Tecom: KuStream 1000, 1500 and 1015, Tecom 5000
- Teleinformatica e Sistemi s.r.l. (TeS): JADA-ER
- Thales: LV10
- Thinkom: ThinSAT 300
Modules 2 - 4
Module 2,3 and 4: Mobilisation, On-site activities & Missions

Preparatory Module 1: Mobilisation of service, Site visit, Permit to Fly

Module 2: Transport of the RPAS and the STAFF to the deployment location
Set-up for the beginning of Missions

Module 3: Activities to keep the RPAS in ready to fly configuration during the entire deployment

Module 4: Flight operations/Missions

DEPLOYMENT
Module 2, 3 and 4: Mobilisation, On-site activities & Missions

- Mobilisation alert
  - Specific contract 1
  - Acknowledgement

- User requests a service

- Deployment definition

- Permit to fly
  - Yes: Specific Contract Module 2, 3 & 4
  - No: Restrictions Procedures, Update Docs, RPAS modifications

- Transport activities
  - Weekly mission schedule

- On-Site activities, Missions
  - Mission report
  - Weekly flight report

- Documentation
- RPAS Configuration
<table>
<thead>
<tr>
<th>Operational modes</th>
<th>Consecutive Flight hours (per sliding 24 hour window) the contractor should be available to fly upon user request.</th>
<th>Consecutive days per week the contractor should be available to fly upon user request.</th>
<th>Estimated average Flight hours per week of operation (see 3.5.1.4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/7</td>
<td>12 or more if so offered as maximum endurance</td>
<td>5 (may include weekends)</td>
<td>40</td>
</tr>
<tr>
<td>7/7</td>
<td>12 or more if so offered as maximum endurance</td>
<td>7</td>
<td>56</td>
</tr>
</tbody>
</table>
Module 2,3 and 4: Mobilisation, On-site activities & Missions

Operations

• RPA will follow the Flight Plan
  • User/EMSA may request via chat:
    • Payloads to be displayed (EO, IR, ...)
    • Payloads mode of operation (tracking, zoom...)
    • Collection of high resolution Images
    • Real-time deviations/path modifications from approved flight plan
      • RPAS Operator will inform Air Traffic Controller
      • ATC may give instructions (standby, negative, etc.)
  • RPAS operator shall inform User & ATC and shall command return-home mode when needed
Data exploitation & visualisation

- User/EMSA access to operational data via a web based video/GIS application.
- Includes a chat for communication between User & RPAS operator.
- Recorded data available for at least 3 Months.

Operations description

- RPA will follow the Flight Plan
- User/EMSA may request via chat:
  - Payloads to be displayed (IR, IR, EO...)
  - Payloads mode of operation (tracking, zoom...)
  - Collection of high resolution Images
  - Real-time deviations/path modifications from approved flight plan
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Module 2,3 and 4: Mobilisation, On-site activities & Missions

Data and data analysis to be provided

• Live Streaming Video (and recorded video access) of the image sensors on the RPA

• The contractor shall analyse the video streams and could:
  • vessel identification
  • any activity which may be taking place (i.e. fishing, towing, transfer, etc.)
  • scanning/sweeping of certain areas for specific targets
  • tracking of objects in support of search and rescue operations
  • oil spill detection and delineation and
  • all the relevant parameters as indicated for behaviour monitoring in section 2.2.4 “Maritime vessel monitoring and general surveillance”
**General rules**

- **Contact with Users**: will go exclusively via EMSA, except that EMSA decides differently (but EMSA always in copy).
- **One operational briefing**: held at the end of the mobilisation phase at the place of deployment.
- **Mission schedule risks**: EMSA to be informed as soon as contractor detects any risk.
- **Change management procedures**: EMSA to be informed of any change in configuration and/or operational procedures. Change management procedure to be provided to EMSA.
- **Incident & Accident**: EMSA to be informed immediately. Contractor make every incident or accident available to EASA (procedure TBD with EASA).
Module 5
RPAS Data Centre

Objectives:
- Common visualization and command interface for all RPAS operations;
- Integration of RPAS data into existing EMSA Maritime Picture, including THETIS and SSN.

Status:
- Live from 1\textsuperscript{st} of December 2017 with first RPAS;
- Progressive further development;
- Integration of other RPAS.
Mission & Deployment Management

Centralized Deployment and Mission Planning

Features:

- Map w/ Deployment Area
- Navigate using Calendar view;
- Launch Live Missions;
- Mission details.
Live Missions

Local Situational Awareness

Mission Command by User

Features:

- Live Video;
- Map view;
- Live Chat with Operators;
- Draw locations/areas of interest on the map and communicate with Operators;
- Export of mission data during and post mission;
- Full mission replay.
Expanding the Maritime Picture with RPAS In-situ Data.

Data exchange:

1. **User Interface**;
2. **RPAS Flight data from on-board sensors**;
3. **EU Wide picture**: satellites images, vessel detection, oil spills, vessel positioning (AIS, VMS, LRIT,…);
4. **In-situ RPAS Picture**: live video, local AIS, Radar, EPIRB, ship emissions and others.

*Other EMSA Services*

- SSN
- IMS
- Copernicus
- CleanSeaNet
- THETIS
- Frontex
- EFCA
- EFCA
- EFCA
- Other

*Exchange of Data while Ensuring Access Rights*

*Concurrent Flights*

- Flight 1
- Flight 2
- Flight N
Integration into EMSA Maritime Picture

Overlaying EMSA Maritime Picture in RPAS missions

Data sources:
- VMS data;
- AIS data;
- LRIT data;
- Optical and SAR images;
- Vessel Detections;
- Oil spills.
RPAS-DC Security

Data security
- Redundant hosting in France
- Biometrical access control
- Restricted user management

Network security
- Secure network protocols (HTTPS, SFTP)
- Virtual private networks
- Cluster of firewall to protect its networks;
- Multiple separated networks;
- Separate VLAN
Module 5: Interfacing

Scope of Module 5:
Interfacing

- **Purpose**: Integration of RPAS Data into EMSA Systems

- **Scope**: Any developments needed to interface with EMSA Systems

- **Contract**: on-demand request by EMSA, signature of Specific Contract
Mod. 5 Links to EMSA Visualization Solution

- EMSA has its **own solution** (RPAS-DC)
- Service Providers solution needs to be available during the whole contract
- ICD document provided in tender specifications. Updated version which improves readability but not the content will be provided.
Protocols and Data

Satellite Planning (OGC-WFS (post)/HTTPS)
Satellite Imagery (OGC-WMS (post)/HTTPS)
Vessels Position (OGC-WFS (post)/HTTPS)
Vessels Detected (OGC-WFS (post)/HTTPS)
Oil Spill (OGC-WFS (post)/HTTPS)

Legend:
- datasource {binding / protocols} {frequency / volume} {component}

EMSA Data Layers

RPAS Data Layers

Deployment A
LCGS

Deployment B
LCGS

RPAS Data

EMSA Services

MS or EU services

User Interface

S-2-S: Data Layers

S-2-S: RPAS Data

EMSA RPAS Services to Users

Users

RPAS data

Video (MPEG2TS+Mjpeg) (STANAG/RTP-UDP)

GAS (REST/HTTPS)
AIS (REST/HTTPS)
EPIRB (REST/HTTPS)
Images (REST/HTTPS)
Oil Spill Reports (REST/HTTPS)
Sulphur report (REST/HTTPS)
Flight planned (REST/HTTPS)
Flight position (REST/HTTPS)
Comm Status (REST/HTTPS)
Chat (XMPP)

Thetis (REST/HTTPS)
Annotation, Measurement reports (OGC-CSW/HTTPS)
Picture (OGC-WMS/HTTPS)
Flight path, EPIRB (OGC-WFS/HTTPS)
Mission Info (REST/HTTPS)
Mission List
Mission ID
Mission video
AIS (websocket/hrefs) [6sec/500 vessels/
Smissions]
{SSN-SI -> STAR-aissat}
LiveMissionData (Pub/Sub/HTTPS)
Protocols and Data

Interface 2: S-2-S RPAS Data - data flows coming from the missions:
- STANAG w/ sensor footprint
- HTTPS POST:
  - Status
  - AIS
  - EPIRB
  - Gasmeasurements
  - Imagery
  - Shipemissions
  - Annotation
  - Position
  - Plan
  - Aircraftcomm
  - Aircraftautonomy
  - missiontoken
- HTTPS GET:
  - Dcstreamstatus
  - Missioninfo

6.2. Metadata send through HTTPS interfaces

The following paragraph describes the different request provided by the RPAS DC real-time API to allow SP to ingest data produce during RPAS flight and not managed by the STANAG 4609 interface.

The types of data to be ingested through HTTPS interface have been identified below. Description of each corresponding requests are describe in the rpas_api OpenAPI specification file.

1. For sensors:
   - AIS messages
   - EPIRB messages
   - Gas measurements
   - Picture and Radar picture (maritime radar and/or SAR outputs)
2. For reports:
   - Sulphur content / NOx measurement reports (for THETIS-EU report)
   - Oil spill detections report
   - Manual detected POI (confirmed by payload operator)
   - Manual detected areas of interest (other than oilspill)
3. For flight status
   - Aircraft positioning (to be use when all videos streaming are down)
   - Mission flight plan (updated on change, Tie points and ETA for each one)
4. RPAS / LGCS status
   - LGCS - RPAS active communication channel (RF / SATCOM / ...) and signal quality
   - RPAS endurance information
5. Configuration
   - API to allow LGCS to login to RPAS-DC and get valid token to push data during mission
   - API to get all stream address:port parameters and information about mission
   - API to set a mission to ongoing status (allow the service provider to Integrate DC action In there LGCS interface)
Module 5: Interfacing

Project Related Topics

• Contact Points

• Schedule, deliverables, risks, other

• Two step validation approach

• RPAS Compliance Suite

• Radar Approach

• Tentative Mod.5 KOM date?
Future missions
Potential services

- Request from Iceland for services based on Hermes 900
  - Mobilisation alert tentative by end November

- Requests or initial discussions also with: Portugal (Açores), Greece on operations with Hermes 900

- Further formal service requests from 13 EU Member States

- Interest in services expressed by additional other 10 EU Member States
Thank you – Questions?

RPAS_contracts@emsa.europa.eu