Heavy Payload Helicoper for Last Mile Rescue

Sprawozdania

Informacje na temat projektu

HELI4RESCUE

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Final Report Summary - HELI4RESCUE (Heavy Payload Helicoper for Last Mile Rescue)

Executive Summary:
See also attached file
Heli4Rescue addresses the possibility for Civil Security operators to use large air transport systems for deploying heavy loads on crisis sites. In the course of the project, in particular systems now being targeted only for military use were investigated for use in civil missions. A broad range of European Civil Security users was involved in developing appropriate requirements for offering transport solutions to the management of large emergencies as often encountered in Europe. Air transport solutions potentially able to meet the requirements were examined, together with operational issues related to vehicle certification, operation regulation and dual-use, with the aim to develop functional specifications that were and will be fed into identified vehicle development and/ or product investment programs. Support to the Civil Security policies was prepared with dissemination activities, dissemination support means and the development of a roadmap towards effective implementation of the analysed solutions and towards a common European approach for the definition of large air transport systems. The main project results are:
- Validated Civil Security user requirements for large air transport systems;
- Functional specifications, compliant with the Civil Security requirements for the Future Transport Helicopter (FTH);
- Functional specifications, compliant with the Civil Security requirements, for Large Sized Airship (LSA);
- Functional specifications, compliant with the Civil Security requirements, for Transport Unmanned Aircraft System (TUAS);
- Use models for heavy load transport VTOL and VSTOL aircraft, taking into account common and interchangeable standards and concepts out of a civilian rescue and disaster relief perspective;
- Feasibility, economic and operational assessment of proposed use models with a key focus on civilian aspects resp. disaster sites;
- Road map for a common EU approach to large air transport system usage, providing cost effective solutions for civilian disaster relief situations.

Note:
The EU finances within the framework of Cleansky 2 various demonstrator programs with the fast rotorcraft program “LifeRCraft” being part of it. LifeRCraft will be designed having a fast and long

endurance search and rescue capability in mind, cf www.cleansky.eu
The first flight of the demonstrator is scheduled for 2019/2020.
This program has been brought to the attention of the collaboration club and has been added to the Heli4rescue project by early 2014, ie at the end of the project.

Project Context and Objectives:
See also attached file
2.1 Context
The project HELI4Rescue is a Support Action funded by the European Union. It addresses the transport of heavy loads within disaster areas to provide help and safety to people in need for rescue and relief affected and caused by disasters. The transport issue has two sides complementing each other:
- Responding to disaster or crises, in terms of fighting emergency situations, rescuing people or restoring safety, having a need for disaster relief efforts such as deploying teams and appropriate equipment (e.g. search and rescue teams, facilities for the evacuation of victims, pumping systems, water purification units, medical units, emergency shelters, command and control centres, etc.);
- Transporting people and equipment to/from relevant disaster areas requires appropriate vehicles able to operate in such an environment. In case of a major disaster, proper infrastructures are usually not available for land transport. Today, air transport is often not appropriate, either because take-off and landing facilities are inoperative or do not exist, or when using helicopters, operating ranges and payloads are not long/heavy enough for efficient intervention.
Heli4Rescue addresses the possibility for Civil Security operators to use air transport systems for deploying heavy loads on crisis sites and matching the two sides of the problem.
To-day, the so-called “last mile” capability concerns groups of aerial or land vehicles carrying payloads between platforms placed around crisis areas. For instance, a carrier boat with disembarking barges and equipped with a helicopter platform coming close to a disaster zone, or an airport near a disaster area being adapted with logistics capabilities to receive large amount of goods. This type of approach yields important implementation delays.
One possible way around such delays is to introduce rapid load transport means, able to carry freight without using dedicated infrastructures (port or airport) and to avoid dropping goods on specific spots of the crisis area. This can be achieved with helicopters and also with airships able to quickly carry loads over significant distances and to perform high precision load deposit on any type of ground. Freight transport with a remotely controlled UAS able to deposit goods on any type of ground with good precision can contribute to shorten response delay. Such aircrafts have the capability to work over high mountains (e.g. in case of avalanches or aircraft crashes) and in CBRN emergency conditions.

The project considers VTOL/VSTOL transport aircrafts capable to provide suitable solutions:
• Conventional manned helicopter, Future Transport Helicopter, Fast Rotorcraft
• Large Size Airship
• Transport Unmanned Aerial System

2.2 Objectives
The project general objective is to contribute to bridge the current gap between Civil Security end-user needs and suitable air transport systems by
- Investigating the use of high capacity air transport systems for security users;

- Gathering and defining clear requirements for Civil Security users;
- Feeding these requirements, including a dual-use dimension, at an early stage of the definition of air transport vehicle programmes for VTOL;
- Defining interchangeable standards and concepts
The project industrial objective is to propose effective and economically viable use models of aircraft fleets that could be attractive enough to justify future investments towards the implementation of these models.

The project specific objectives are:
1. To collect significant inputs and guidance from Civil Security users and other relevant actors involved in crisis management, logistics and air transport systems.
2. To identify major logistic problems encountered in Europe during crisis response and post-crisis restoration and to collect Civil Security needs for solving these problems.
3. To define missions covering the Civil Security needs and to derive associated requirements for air transport systems. To validate the relevance and completeness of the proposed requirements.
4. To propose workable solutions for specific issues encountered for covering the Civil Security needs and meeting the derived requirements, such as interoperability, supply chains, interfaces for dual use, communication or insertion into emergency management processes.
5. To investigate the use of heavy load and fast helicopters, large size airships, unmanned aerial systems and specific aircraft related issues (certification, operation regulation). To propose ways to take the Civil Security requirements into account and to develop functional specifications to be considered in future aircraft development programmes.
6. To propose use models for the investigated VTOL/VSTOL aircrafts and to analyse the feasibility, economic aspects and implementation issues of these models.
7. To propose a road map towards effective implementation of the proposed use models and towards a common European approach to heavy load air transport definition for crisis management.
8. To disseminate information about the project and obtained results to policy and decision makers in the areas of Civil Security and air transport.

Project Results:
See also attached file
The project work plan includes four main activities defined to provide a path towards achieving the project objectives:
- Analyse the problem (Work Package 3);
- Develop end-users requirements (Work Package 4);
- Investigate the use of air transport (Work Package 5);
- Deployment models for proposed solutions and perspectives (Work Package 6);
These are supported by two horizontal activities for:
- Collecting inputs and feedback external to the project (Work Package 2);
- Project management and coordination (Work Package 1).

3.1 Inputs external to the project (WP2)
Objectives and scope
WP2 is dedicated to getting information and collaboration from sources external to the project consortium. For that, it relies on the organisation of an operational framework able to make external collaboration

effective. This framework - named Collaboration Club (CC) – was obtain by setting base principles, defining operational rules and gathering members ready to collaborate.
WP2 objectives are:
1. To set up a Collaboration Club;
2. To develop an External Contribution Plan;
3. To define methods and supporting tools for collecting external inputs;
4. To organise focused workshops to collect external inputs;
5. To organise two general workshops with external collaborators as part of, respectively, requirements validation and “way to the future” approval

Activities performed
Aiming to address real issues and to build upon existing experience and knowledge, the project sought information from a wide range of people involved in crisis response and restoration activities. This was done within an organisation called “Collaboration Club (CC)” providing a framework and procedures for collecting inputs from all relevant actors.
The club structure includes four branches related to the four main types of profile encountered in crisis management/ response/ restoration and surrounding services:
1) Civil Security users (e.g. Public Security and Safety organisations; Authorities; Responders involved in crisis response or restoration deployment).
2) Other actors involved in crisis response and post-crisis restoration (e.g. carriers and logistics operators; Search and Rescue specialists; Relief/ medical organisations; Safety restoration specialists).
3) Facilitators of air transport operations (e.g. Airworthiness Authorities; Operation regulators).
4) Aircraft developers (e.g. specialised manufacturing and integrator enterprises; Stakeholders in military and civilian development programs).

The CC members brought useful inputs and contributions to the project in regard to:

- The variety of possible crises situations and practices,
- The European dimension,
- Information needed on topics as different as user requirements, logistics, air transport system, regulatory issues and airborne vehicle program development.
Achievement, main outputs/results
The following was done during the project time period:
- On defining and developing the Collaboration Club
o Definition of rules and procedures for CC operations.
o Development of support documentation for recruiting CC members.

A total of 61 persons joined the club.
- On Developing an external collaboration plan
o Analysis of the project work plan and development of a list of the needed inputs and their timing with respect to the project anticipated progress.
o Identification of relevant events to be held during the project time scale which could eventually be used to create some synergy with CC activities, as well as to disseminate project information.
o Development of an External Contribution Plan, including a list of workshops with dates, venues and

topics to be covered.
- On implementing the external collaboration plan
o Organisation of 6 CC workshops
o On 29-30 November 2012 in Rome, Italy
• 19 CC members attended this first CC meeting
o On 18-20 February 2013 in Donauwörth, Germany
• 23 CC members attending
o On 8-10 April in Aix en Provence, France
• 25 CC members attending
o On 24-26 June in Prague, Czech Republic
• 22 CC members attending
o On 11-14 November 2013 in San Quirico, Italy
• 23 CC members attending
o On 22-23 January 2014 in Brussels, Belgium
• 26 CC members attending
o Organisation of one General Workshop on 23 January 2014 in Brussels, Belgium

A total of 39 persons attended at least one CC meeting 33 persons attended at least 2 CC meetings and 18 persons attended at least 4 CC meetings.

- On exchanges with Collaboration Club members
The following approach was used, based on exploiting meeting experience to improve future exchanges.
o Collection of feedback from participants. Analysis of workshop outputs with the aim to make future workshops effective. Overall, the workshops were appreciated by the participants and considered successful by the project partners.
o Organisation of CC meetings, according to feedbacks, with plenary sessions and parallel sessions with small groups working on different thematic. For example, in the Aix en Provence meeting, the participants were split into four groups with a moderator. The groups met in separate rooms and worked on the definition of reference missions for the rescue task identified as more relevant (i.e. Flood and Sea Rescue, Earthquake/Tsunami, Environment and Fire).
o Request for information elements supply by CC members. For example, concerning the modules registered in their country within EU Civil Protection Mechanisms.
o Internet Access reserved to CC members. Members could upload information on each CC meeting (agenda, minutes, documents, list and contact of participants).

Example of verbatim from Contribution Club Members:
“Do we need large VTOLs? Yes. The project worked well towards long-term plans. Harmonisation and standardisation are important bits to work on. I learnt a lot. Thank you”.

“Even if large VTOLs are needed, they will hardly be affordable to many small EC countries. I would put UAS as achievable goal, while FTH would require a common effort between Member States. Strong regulations would help industries. I think too that workshops should be longer”.

“Being here convinces me further about the relevance of large VTOLs. Keep on going you are on the right

way”.

3.2 Problem analysis (WP3)
Objectives and scope
WP 3 objectives are:
- Investigations To identifies the major logistic problems encountered in Europe during crisis response and post-crisis restoration;
- To selects the critical problems to be addressed with air transport and collects Civil Security needs in a view of solving these problems;
- To investigate air transport systems potentially able to bring suitable solutions to crisis logistic problems and to validate the choice of the aircraft to be considered in the project are focused on the analyses of emergency and crisis situations, available statistical information, humanitarian/first response assistance and evaluation of present teams – in term of logistics.

Activities performed and main outputs
The first overall analysis of Civil Security needs and potential air transport contributions was the basic step. The analysis focused on the main problems connected with humanitarian assistance, ways for transporting of material and equipment.

Problem analysis
Civil Security needs and a potential air transport contribution identifies the major logistic problems encountered in Europe during crisis response and post-crisis restoration. It selects the critical problems to be addressed with air transport and collects Civil Security needs in a view of solving these problems. It is focused on the analyses of emergency & crisis situations, available statistical information, humanitarian/first response assistance and evaluation of present teams – in terms of logistics.
A detailed overview has been elaborated, focused on the disaster, including their division. As a disaster it is considered any situation bringing exposure to risk factors to health, life, property or the environment. For statistical purposes, disasters were analysed according to:
a. Ten (10) or more people reported killed.
b. Hundred (100) or more people reported affected.
c. Declaration of a state of emergency.
d. Call for international assistance.

Statistics indicate that the number of the natural disasters has increased continuously from 1950. The last decade is influenced by the “disaster season” – year with appearance of a huge number of disasters. The number of people killed by natural disasters has rapidly decreased since 1965 (civil protection system established, early warning etc).
The number of the technological disasters reached the highest level from 1995 till now. The number of people killed by technological disaster has rapidly decreased since 2005 (safety and security rules). Despite these facts, the estimated damages are increasing due to the development of the industry. From the perspective of man-made disasters it is difficult to find comprehensive statistical data.
From the perspective of global assessment of the impact on the population, the biggest disasters are floods, earthquakes and fires. Most of the disasters that caused the activation of the EU Civil Protection Mechanism were floods, earthquakes and forest fires.

The complex system of international humanitarian assistance was described including their principles. Humanitarian assistance can be defined as the material or logistics assistance provided for humanitarian purposes in response to crises including natural disaster and man-made disaster. The primary objective of humanitarian aid is to save lives, reduce suffering and maintain human dignity. It may be therefore distinguished from development aid which seeks to address the underlying socioeconomic factors that may have led to a crisis or emergency.
The time period of humanitarian assistance depends on the type of assistance. It can be divided into several phases:
- Immediate
- Recovery.
- Reconstruction.
- Development.
The humanitarian assistance is based on:
- Bilateral/Multilateral agreement.
- International assistance upon request.
- Humanitarian providers/organizations.
There exist operational command control tools for humanitarian assistance such as the United Nations - Office for the Coordination of Humanitarian Affairs. Other organizations focus on humanitarian assistance, like the European Union – Directorate General for Humanitarian Aid and Civil Protection, EU Civil Protection Mechanism and Euro-Atlantic Disaster Response Coordination Centre.
Implementation of humanitarian assistance can take different ways. The first possibility is a deployment of specially trained experts able to perform tasks in international rescue operations – coordination and needs assessment like UNDAC Teams, EU CP Teams, National expert Teams, other Teams (NGO´s etc). Another possibility is a deployment of humanitarian material (financial humanitarian assistance). The primary objective of humanitarian aid is to save lives, alleviate suffering, and maintain human dignity. It may therefore be distinguished from development aid, which seeks to address the underlying socioeconomic factors which may have led to a crisis or an emergency.
A very important way of providing humanitarian assistance is the deployment of pre-defined Teams – USAR Teams and EU CP modules. USAR Teams focused on international response can be divided into two groups:
- Medium USAR Teams,
- Heavy USAR Teams.
INSARAG has developed a voluntary, independent peer review process of international USAR teams - the INSARAG External Classification (IEC). Between 2005 and 2012, 34 international teams have been successfully classified.
Civil protection assistance often consists of highly specialized equipment and teams for tasks such as search and rescue, high capacity pumping, or aerial forest fire fighting. The Civil Protection response makes thus a vital contribution in the immediate post-disaster phase.

Till now the following types of modules have been established:
I. High Capacity Pumping (HCP)
II. Flood containment (FC)
III. Flood Rescue Module using Boats (FRB)
IV. Water Purification (WP)

V. Aerial Forest Firefighting module using Airplanes (FFFA)
VI. Emergency Temporary Shelter (ETS)
VII. Advanced Medical Post (AMP)
VIII. Chemical, Biological, Radiological and Nuclear detection and sampling (CBRNDET)
IX. Medium Urban Search and Rescues (MUSAR)
X. Search and Rescue in CBRN conditions (USARCBRN)
XI. Heavy Urban Search and Rescue (HUSAR)
XII. Ground Forest Firefighting (GFFF)
XIII. Ground Forest Firefighting using vehicles (GFFFV)
XIV. Aerial Forest Firefighting module using Helicopters (FFFH)
XV. Field Hospital (FH)
XVI. Medical Aerial Evacuation of Disaster Victims (MEVAC)
XVII. Advanced Medical Post with Surgery (AMPS)
XVIII. Technical assistance support team (TAST)

Only USAR Teams have their Guideline and system for establishing and approving their capabilities in the framework of international response.
Despite the INSARAR, IEC process and existing rules and recommendations it is almost impossible to standardize the USAR teams, primarily due to huge variability in the number of people and equipment
There is currently no tool or process that would standardize or even define more clearly the modules.
The modules have standardized functions, but they are of a different size – number of people, material, and equipment and different logistics, depending on the individual needs. Nowadays, there is no unification or standardisation.
In making the final delivery to the disaster place, we must ensure an acceptable balance between the speed, efficiency and safety. The humanitarian assistance should be provided urgently at a precise time with 100 per cent reliability. This would minimize aftermath of the disaster.
Usually the time is short to find survivors that may be buried under rubbles and therefore speed is a top priority. Medical services, food, water, shelter and sanitation are desperately needed as well.

During and after the disaster the affected country usually has:
- Damaged infrastructure.
- Non-availability of services/techniques/vehicles
- No local resources.
- Time frame.
- Safety & Security problems.

There is also frequent duplication and lack of coordination within and among the supply chains of organizations.
The emergency aid in these circumstances is totally dependent on local preparation, and any aid that will come from outside the area will be largely ineffective until the logistics has been cleared up – which is usually only after several days in the best circumstances.

The logistics is all about the five “rights”:
- the right goods,
- in the right quantity,

- to the right place,
- at the right time,
- at the right price.

One of the main issues here is that in a chaotic situation like this we just don't know what are the right goods, the right quantities, or even the right place. The correct assessment is incredibly difficult, especially when the affected areas are difficult to access.

The equipment and material can be transported with the use of free loading, i.e. the material can be stored in boxes or free and the boxes can be stacked or as Unit Load Device.

From the perspective of effective transport of humanitarian assistance materials, equipment rescue teams need to create some standardization. This is essentially standardized information on the volume and weight of the transported equipment. There is currently no established standard form for collecting information on equipment sizes rescue teams, which would allow assessing the possible mode of transportation. Some forms contain information such as weight or volume of the equipment.

From the perspective of the transport is necessary to evaluate not only the volume and mass characteristics, but as well the character of the load, e.g. hazardous substances, drugs, compressed gases and the like. It is important to also maintain personally identifiable information to transporting goods, such as registration number or serial numbers. In some transport cases, specific parameters (power, frequency, etc) of the communication means are required for the transport to be recorded.

The selection of the most appropriate transport solution requires in depth information about the pre-defined teams and modules to be transported. We have to state that the information provided in the fact sheets of pre-defined teams is not enough. It is necessary to obtain a more detailed list of equipment including the biggest items that are not positioned in transport boxes. The transport box will allow storing maximum amount of equipment. Each module should describe the amount of the maximum dimensions and weight.

The equipment must be transported in stackable transport boxes which are placed in the ULD containers or pallets.

For the second way of transporting it is necessary to develop the platform and containers for the transport as external load.

The last system of transport is possible in an helicopter cabin by free loading. The equipment is placed in the same transport boxes.

The helicopter should be equipped with rescue winches for unloading the team members in the case of impossibility of landing.

The loading of the equipment should be done through VTOL onboard means (cargo winch, ramp, cargo rolling device, crane, etc) wherever possible.

Potential transport solutions

Another part of the study performed within WP3 was focused on the description of three potentially promising aircrafts:

1. FTH – Future Transport Helicopter – including the desired capabilities (dimensions, minimal loading capacity, cabin size, pallet and container transport, external loading capacity),
2. LSA – Large Size Airship - including the desired capabilities,
3. TUAS – Transport Unmanned Aircraft System - including the desired capabilities (maximum takeoff weight, maximum useful load, internal loading capacity).

The fast rotorcraft program "LifeRCraft" designs a VTOL which prime mission will be to quickly rescue people. The transport capability will be limited and is therefore not intended to be used for heavy cargo

transport.
For these three solutions, main characteristics were provided. There were made a description of actual stage of these aircrafts with the conclusion, that there is no suitable type with required technical and technical behaviours available on the market. A comparison of transport capabilities of current and future transport solutions was done in these five representative disaster operations.
An evaluation of the key performance aspects of the FTH, LSA and TUAS shows that they are designated for different operational scenarios. The results are used to point out the gaps to be bridged between civil security needs and potential air transport contributions and requirements for civil security users.

3.3 Requirements for Civil Security users (WP4)
Objectives and scope
WP 4 objectives are:
- To select and/or define Civil Security crisis and disaster management situations related to the problems and needs selected in WP3;
- To derive Civil Security user requirements;
- To validate these requirements and to organise them to enhance their exploitation in aircraft development programmes.

Activities performed and main outputs
The Civil Security user requirements definition has been facilitated by focussing the reasoning of the H4R project team and Collaboration Club (CC) members over a definite number of carefully selected realistic and representative scenarios, which include crisis and disaster management situations, describing the tasks to be performed to satisfy the priority Civil Security needs (i.e. rescue people from isolated terrestrial or maritime sites, fighting wild fires, deployment of equipment and aid supplies, deployment of command and control centres, bringing hospital or decontamination equipment on crisis sites, etc.) as well as the associated implementation features (i.e. dropping, not dropping items, bringing items to crisis site or to a nearby location with given characteristics, etc.).
The crisis and disaster management situations encompass the various stages of the life cycle of considered crises, including minor emergencies which can escalate in scale up to major crises, to allow defining requirements compliant with existing aerial means as well as for heavy load transport.
The inputs collected by the Collaboration Club (CC) members contributed to the definition of reference crisis and disaster management situations and their operational environment in the framework of the selected sets of representative scenarios.
Following a process iteration, such crisis and disaster management situations have been further detailed with the associated features needed for deriving the dimensioning requirements that should have been met by air transport systems, including:
• required transport capacity,
• interface aspects between items to be transported and aircraft,
• interoperability of transport means and
• civilian communication capabilities required on board of a military aircraft.
Further on civil operation regulation requirements concerning civil defence crisis and disaster management situations were considered and submitted to the Collaboration Club members for validation.
The whole process resulted into a Civil Security requirement package, which wants not only to impact the air carrier, but in the other way around too, wants to give input to the standardization process of rescue

vehicles, modules and tool boxes able to be carried seamlessly by all the transport means, so as to speed up by far the deployment time of the rescuers.
In order to select, define and validate the Crisis and disaster management situation scenarios as well as to derive the Civil Security requirement package, validated Priority Civil Security user needs and potential capabilities have been taken as guidelines for the process of collecting inputs from the Collaboration Club members to select a set of reference crisis and disaster management situations – more concisely reference disasters - to be depicted in the framework of representative scenarios.
So that the CC members were able to take the move from the tasks to be performed to satisfy the priority Civil Security needs and the associated implementation features to derive sets of reference crisis and disaster management situations and their operational environment within representative scenarios (e.g. Earthquake Haiti 2010).

Similarly, it has been elaborated and proposed for approval to the CC members a rescue tasks list and a rescue tasks classification, so as to enable the selection of the reference rescue tasks (e.g. Deployment Civil Protection Module Field Hospital) which have to be carried out in the framework of the selected reference scenarios in order to build up reference missions (e.g. Deployment of German Red Cross Field Hospital to Haiti for the earthquake occurred there on 12 January 2010).

When H4R was extracting user requirements from those reference missions, further information on the 'boundary conditions' (e.g. weather conditions) have been retrieved by some CC members, selected on the basis of their specific background and experience.
Each reference disaster has been used to build up several reference missions. Then the CC members have been asked to select the best candidates for reference events to build up all the needed H4R reference missions.
Later on, the CC members were asked to contribute the first inputs to the collection of Operational regulation requirements, taking in due regard the previously mentioned validated results, which mainly focussed on:
• EU requirements for civil defence crisis and disaster management situations
• JAR-Ops requirements for civil defence crisis and disaster management situations
• National regulations requirements for civil defence crisis and disaster management situations
• Overview of Military regulations of interest for civil defence crisis and disaster management situations
Soon after the validation of the list of selected reference missions, the CC members agreed on a format to extract user requirements in the most comprehensive way, up to include the largest number of Civil Security user requirements – and the most critical - to carry out the selected reference missions.
Based on such inputs and after further refining, the format was submitted to the CC members to collect and agree on a validated, comprehensive set of Civil Security user requirements, having in mind the selected tasks and the related reference missions.
The Civil Security requirement package aims at an as-large-as-possible incorporation into the design of future VTOL targeted to Civil Security missions. However, the same requirement package wants to steer the standardization process of rescue vehicles, modules and tool boxes, which can then be easily accepted by any transport mean, speeding up by far their deployment time.
The Reference Missions previously selected have been later on used to assess what 'boundary conditions' (e.g. wind direction and strength, temperature profile, module dimensions and weight) were critical to

define the list of items (or features/conditions) to be included into the User Requirements. The definition of these “user requirements’ items” was a turning point for H4R, because, to reach an agreement on them, users and industry had to learn how to see the needs from the point of view of their “counterpart”.
Once defined, such items were included into a User Requirements Form to be applied to each and all the Reference Rescue Tasks and be submitted to the Collaboration Club members and H4R experienced users.
The resulting requirements have then been organised into exploitable sets of Civil Security requirement package - presented by Requirement and by Reference Mission - which have been submitted for validation to the Collaboration Club members. As a whole, they detail the Civil Security dimensioning requirements which have to be met by air transport systems targeted to crisis and disaster management situations.

3.4 Transport issues (WP5)
Objectives and scope
WP 4 objectives are:
- To develop, describe and evaluate possible supply chains enabling the aircraft supported crisis and disaster management situations identified in WP4;
- To determinate the requirements for interoperability and the needed supply network
- To derive technical requirements from the supply chain solutions, which can be fed to the air transport system design specifications;
- To identify which civil requirement can and cannot be fulfilled within the planned military specification;
- To identify crisis and disaster management situation packages;
- To identify fixed provisions on each aircraft to allow a rapid conversion;
- To estimate the effort to take any open civil requirement into account.

Activities performed and main outputs
During the course of the project, the fast helicopter project, which is being proposed within H2020 as an Integrated Aircraft Demonstrator Programme (IADP) in the frame of Cleansky 2, has been added as a reference helicopter, see Figure 1. It became apparent in discussion with the Collaboration Club members that not only size, but for some mission especially speed matters. This fact was also taken into account in well described in the project video.
As reference for Large Sized Airship (LSA) the rigid airship from the Euroairship project has been considered. This project is under funding phase with patent technology for automatic ballasting system. Thanks to new technology applications in structure, membrane and to its natural aerostatic lift and automatic ballasting system, LSA is very efficient for autonomous heavy lift transport and firefighting and Civil Security missions. LSA is also very cost efficient and environmentally friendly with regards to other aerial or terrestrial means.
For Unmanned Air System (UAS), the Soft Wing aircraft has been chosen as reference. Built around an European pallet with 1 cubic meter available space and 400 kg useful load the Soft Wing Aerial Navigator SWAN opens doors to fast change of Mission Equipment Packages within 15mn, which gives the Civil Security forces the ability to use many functionalities within the same disaster treatment period.
The civil requirements, including those derived from the civil operation requirements, which go beyond known military requirements, have been identified in various workshops with the Collaboration Club and its design impact analysed and quantified in terms of schedule, cost and weight whenever possible.

The results of the assessment on the Civil Security user needs and description of the design impacts to render the FTH, LSA and UAS compatible with the Civil Security user requirements were collected from the Collaboration Club members and captured in a FTH specification document. The three VTOL designs have been checked with respect to impacts regarding structure (size), avionics (communication), general performance (payload and range) and dedicated crisis and disaster management situation equipment. Furthermore, a description of the identified required crisis and disaster management packages was prepared. The packages were derived from the assessment exercise and have been validated together with the Collaboration Club. It is essential for a low cost inclusion of civil requirements to the VTOL to include any fixed provisions required for the rapid crisis and disaster management situation conversion at an early stage of the design. These provisions have been identified and an overview of them is contained in the specification document D5.3.In addition to the need for the deployment of heavy transport VTOL a further need was identified: fast rotorcraft. Speed and endurance is a top requirement especially for maritime search and rescue and long distance SAR. This requirement has already been identified in the Advisory Council for Aviation Research and Innovation in Europe SRIA (Strategic Research and Innovation Agenda) which delivered a significant input to the preparation of the aviation section of the EC framework programme 8 (Horizon 2020). The successor to CleanSky, named CleanSky2 started in July 2014. CleanSky 2 supports the development and testing of fast rotorcraft which will amongst other missions be designed to fulfil the needs of maritime and long distance SAR.

The European Commission (DG Move) has started a policy initiative on aviation safety in May 2014 to possibly revise Regulation (EC) No216/2008 (the EASA basic regulation).
The Heli4rescue project identified the need to harmonise the operational regulations for helicopters within the EASA member states. This need was brought to the attention of the EU Commission via an appropriate response to the above mentioned public consultation.

3.5 Deployment models, dissemination and exploitation (WP6)
Objectives and scope
The main goal of HELI4Rescue dissemination is to make the project results known to the right people in Europe and to support or initiate actions that would allow moving forward the issues explored in the project, namely:
- Feasible ways to carry heavy loads onto crisis areas combining efficient multi-modal transport (land, seaborne and airborne), with strong focus on airborne solutions, and associated logistics aspects;
- Definition of airborne vehicle functional specifications that could be considered in vehicle development programmes to facilitate future usage in relief functions and also in possible dual applications.
- Sustainable (i.e. economically viable) models to implement effective solutions satisfying end-user requirements and constraints related to regulations (e.g. flying ‘unusual’ vehicles in several countries), decision making, organisation and practices in crisis management and crisis response.

Aside the forgoing and more specifically WP 6 pursued the following main objectives:
• To analyse and suggest a sustainable and viable organisational model to allow the EU Civil Security community to have a VTOL/VSTOL task force available at affordable cost;
• To present the result of the project to the widest stakeholder and decision-maker community for supporting the implementation of the EU policies in Civil Security;

• To create awareness about the project and disseminate its results within the Civil and Military Security communities;
• To propose a road map for a common European approach to large air transport system definition and for the implementation of the proposed model assumptions.

Activities performed
WP6 includes three tasks addressing respectively “Deployment models” (task 6.1) “Information dissemination” (task 6.2) and “Policy support actions” (task 6.3). The main activities performed are:
- Investigations on possible deployments models for the air transport solutions proposed in WP5.
- Initially setting up and updating the project web site (www.heli4rescue.eu).
- Developing a dissemination video explaining and illustrating with real and virtual pictures the problem area and the solutions proposed by HELI4Rescue, see the video at https://www.youtube.com/watch?v=ZEmcr-mYgZM.
- Developing and implementing the dissemination plan.
- Organising and participating at different dissemination events, some of them within larger events related to HELI4Rescue issues, e.g.:
• Salerno
• Westport
• Brussels
- Proposing a road map for future deployments and implementation of the proposed models, addressing all relevant topics on the short-term, the medium-term and the long-term.

Main results
In addition to the deployment model (see Deliverable 6.1) and the road map (see deliverable 6.5) for deploying the proposed models, significant results were achieved in dissemination activities.
A total of 37 dissemination actions were performed by the HELI4Rescue partners over the 23 month project period, under several forms: presentation, publication, conference, meeting, fair, field exercise and press article.
Dissemination had a wide geographical coverage with participation at events in 9 EU countries (AU, BE, DE, FR, IRL, IT, LAT, NL, UK) and in Russia.
The variety of dissemination actions allowed addressing the main stakeholders of crisis response and related air transport issues, including aircraft manufacturers and Civil Security end users. The Federation of the European Union Fire Officer Associations (FEU) was a special dissemination target with participation at three of their meetings during the project time frame in respectively November 2012, May 2013 and May 2014.
In addition to the dissemination events, a project website and a project video was created.

Web site
The project web site (www.heli4rescue.eu) was designed to make it a useful information tool for different types of users. Three parts resp. levels were developed and maintained:
- A general information part, open to everyone carrying project information, event, public reports and non confidential results;
- A part dedicated specially to members of the Collaboration Club carrying the schedule on future meetings, the topics to be prepared (eventually through questionnaires), syntheses of previous meetings

and all information recognised as useful for the CC members;
- A part reserved to the project partners carrying reference documents (e.g. project DOW, Consortium Agreement), the issued reports and working documents of interest to be known. This level is linked to a secured server (BSCW) accessible by the consortium partners only.

The relevant project presentations and the project video are accessible via the website.
Video
A 6 minute video was developed in five languages, to explain and illustrate with real and virtual pictures the problem area and the solutions proposed by HELI4Rescue. This video can be seen by all in YouTube through the link https://www.youtube.com/watch?v=ZEmcr-mYgZM or via the H4R project website.

Potential Impact:
See also attached file
4 Potential impact, dissemination and exploitation
4.1 Potential impact
Contribution to expected impacts of the EU Security programme
The HELI4Rescue project was designed in compliance with the scope and objectives of the EU Security programme and more specifically along the guidelines of the topic “Definition of requirements by Civil Security end-users for large air transport systems”. The project was successfully completed and the sought objectives were achieved. The project results are contributing to some of the expected impacts of the Security programme.
Potential impacts of the project results and subsequent exploitation are outlined below.

Strategic impacts
HELI4Rescue outputs provide concrete elements which could be used as baseline to future developments contributing to bridge the current gap between Civil Security end-user needs and suitable air transport systems. Related strategic impacts are:
1) The project results, in particular use models and feasibility/economic analyses, provide some ground in view of defining possible cooperation between several stakeholders in Europe in order to overcome cost barriers and to benefit from large and/or better suited air transport facilities. Cooperation necessity will lead to envisage a common approach at EU level for large air transport systems.
2) The capability to use large air transport systems within costs compliant with Civil Security budgets will open the way towards different crisis management/response practices and enhanced efficiency.
3) The dual dimension examined in the project will open a door to adapted aircraft certification and operation regulations for extended use of future aircraft to the benefit of Civil Security. Appropriate certification/regulation will also allow using other types of VTOL or VSTOL aircrafts, like those examined in the project, made possible by technological progress and developments.

Societal impacts
The main societal impacts of HELI4Rescue come from improvements in crisis response and post-crisis safety restoration under emergency conditions. The possibility to use heavy payload VTOL aircraft will allow carrying people and equipment to crisis sites in bigger quantities/weights than with e.g. the helicopters presently used and reduce the time needed to provide effective and efficient actions. This type

of improvement could significantly help reducing the number of human victims and material damages in many disaster scenarios.
The social value of impacts can hardly be evaluated. It has been demonstrated that improving operational capabilities of forces and their interoperability are crucial factors that can significantly reduce the social impact of any kind of unpredictable critical situation.

Environmental impacts
Different types of direct or indirect impact of HELI4Rescue can be envisaged in relation to improved and faster crisis response. For instance:
- Reduction of wildfire damages on burned vegetation, destruction of ecosystems or emission of carbon dioxide;
- More efficient use of natural resources in resolving an emergency. The usage of water or harmful, but required, chemicals can be minimised;
- Reduced exposure of hazardous materials through shorter intervention times. Besides reducing damages to human and animals, this also improves recovery rates of the environment (e.g. nuclear, biological or chemical).
Economic impacts
• By contributing to saving human lives, limiting damages on natural resources, reducing impact on health and preserving property and industrial means, the project results will also contribute to lower the economic impact of a disaster.
• By contributing to faster and more efficient responses, the project will have an impact on reducing the cost of intervention means.
• The project outcome could contribute to open new air transport market segments based on dual use or shared facilities, which could in turn contribute to improve EU competitiveness through technology/aircraft development and maintenance/support services.

4.2 Dissemination
Information dissemination was performed by the HELI4Rescue partners according to a dissemination approach and a dissemination plan defined with the goal to contribute to make the project results known to the right people in Europe and to support actions that would allow taking further the issues explored in the project, see also above, some contents may be repetitive.
Overview of dissemination actions
A total of 37 dissemination actions were performed by the HELI4Rescue partners over the 23 month project period, see above. They include different types of actions such as presentation, publication and press article performed within several contexts like conference, focused meeting, fair and field exercise.
The performed dissemination features a wide geographical coverage with participation at events in 9 EU countries (AU, BE, DE, FR, IRL, IT, LAT, NL, UK) and in Russia.
Events dedicated to European communities such as ‘European Union Fire Officer Associations’, ‘Public Safety and Communication Europe’, ‘Search and Rescue Europe’ or ‘European Rotorcraft Forum’ were privileged dissemination targets.
The variety of dissemination actions allowed addressing the main stakeholders of crisis response and related air transport issues, including aircraft manufacturers and Civil Security end-users.

Dissemination support

Several elements were developed to support dissemination actions or to provide ad-hoc dissemination. These include:
Material: such as harmonised presentation templates, flyer and roll-out poster.
A project web site (www.heli4rescue.eu) designed to make a useful information tool for different types of users. Three parts were developed and maintained:
- A general information part, open to everyone carrying project information, events data, public reports and non confidential results;
- A part specially dedicated to members of the Collaboration Club carrying the schedule on future meetings, the topics to be prepared, syntheses of previous meetings and all information recognised as useful for the Collaboration Club members;
- A part reserved to the project partners carrying reference documents, released reports and working documents of interest. This level is linked to a secured server accessible by the consortium partners only.
A video explaining and illustrating - with real and virtual pictures - the HELI4Rescue problem area and the solutions proposed. This video can be seen on YouTube through the link https://www.youtube.com/watch?v=ZEmcr-mYgZM or via the H4R project website.
Events
Participation to the following events is highlighted from the various dissemination activities performed by the project partners.
FEU meeting
The Federation of the European Union Fire Officer Associations (FEU) has the principal aim of enhancing fire safety and provides expertise to European bodies in matters concerning the development of fire brigades and fire safety in Europe. FEU has regularly semi-annual meetings. The Council meeting from 31 October 2012 to 04 November 2012 in Amsterdam was used to introduce HELI4Rescue to the FEU community.
PSCE Conference
The PSCE (Public Safety and Communication Europe) conference held on 28-29 November 2012 in Rome was attended by HELI4Rescue partners to perform dissemination and to organise the project first Collaboration Club Meeting following the conference. The conference addressed key topics within the domain of crisis communication.
BLV working group
The task group humanitarian logistics – BVL (German association of logistics) has set up a working group pursuing to develop solutions for a better humanitarian logistics. HELI4Rescue was introduced to the group of 25 logistics experts from different public and private organisations during the meeting of 22 January 2013 in Leipzig. The introduction found a substantial interest in this community.
EU TWIST 2013
The Tidal Wave In the Southern Tyrrhenian sea (TWIST) disaster exercise held in Salerno on 21 October 2013 (http://www.protezionecivile.gov.it/jcms/en/view_new.wp?contentId=NEW39552) gave a valuable insight into Civil Security actions at large European scale. The HELI4Rescue consortium members were invited as observers to the exercise.
Westport - Ireland
The Federation of the European Union Fire Officer Associations (FEU) has the principal aim of enhancing fire safety and provides expertise to European bodies in matters concerning the development of fire brigades and fire safety in Europe. FEU has regularly semi-annual meetings, of which the one in Westport from 21.05.2014 - 24.05.2014 has been used to disseminate the results of HELI4Rescue to the FEU

community by Harald Sieke. The aim was to provide information about the project. Altogether, the audience showed a huge interest in the results and were eager to know when those will be used by decision makers..
Final workshop on HELI4Rescue
The final conference for presenting the final results of HELI4Rescue took place in Brussels on Wednesday June 11th 2014. The program was as follows:
1. Welcome notes
Bernhard Klein; Head of Unit Economic Affairs and Media, Representation of the Free State of Bavaria to the EU
Khoen Liem; European Commission, DG Enterprise and Industry
Prof. Uwe Clausen; Fraunhofer Institute for Material Flow and Logistics

2. Why new VTOL in Civil Protection for Europe?
Stefano Villa; Swiss Armed Forces, Training Unit Engineer/Rescue
3. Goals and Approach of HELI4Rescue
Vladimir Vlček; Czech Association of the Fire Officers
4. Results of HELI4Rescue
Harald Sieke; Fraunhofer Institute for Material Flow and Logistics
5. Road map for effective implementation of solutions in Europe
Harald Sieke; Fraunhofer Institute for Material Flow and Logistics
Presentations can be downloaded at http://www.heli4rescue.eu/downloads/.

4.3 Results exploitation
Results of project HELI4Rescue are outcomes of investigations performed by the partners, with the support of members of the so-called Collaboration Club. Exploitation of such results will be through using them (i.e. taking into account findings and gained knowledge) for the development of processes geared towards the overall goal of having the capability to deploy efficient air transport based responses to major disasters likely to occur in Europe. One of the project findings is that such a goal can be achieved in a cost efficient and effective (i.e. fast response) way only when considered at EU level, which implies some standardisation and harmonisation.
The main HELI4Rescue results are:
- Focus on four disaster types: earthquake, flood, fire and man made;
- Reference missions for the focus disasters;
- Mission Tasks (14 main tasks retained) for each disaster type;
- Process description for the Mission Tasks for relevant disasters;
- Logistics requirements for the Mission Tasks for relevant disasters;
- Focus on VTOL/VSTOL aircrafts: Conventional and compound (fast) helicopter, future transport helicopter (FTH), Unmanned Airborne System (UAS) and Large Sized Airship (LSA);
- Applicability of the focus aircrafts for the Mission Tasks for relevant disasters;
- Definition of a high hazard potential map in Europe for the focus disasters;
- Models for aircraft deployment in regard to the high hazard potential map;
- Possible business models for exploiting needed aircraft resources;
- Road map for future deployments and implementation of the proposed models.
The roadmap is an important output for future perspectives. It is based on a vision of a European Civil

Protection Rapid Reaction Force running a selection of high-value assets whose use could not be justified by the expected disaster frequency at National level, while it is justified at European level. Such force could be set up by the EU following the Decision No 1313/2013/EU of the European Parliament and of the Council of 17 December 2013 on a Union Civil Protection Mechanism published on 20 December 2013 in the Official Journal of the European Union.
The road map addresses all relevant topics for the deployment of the proposed models respectively on the short-term, the medium-term and the long-term. These topics are:
- Interoperability
- Response models
- Deployment models
- VTOL development
- Markets and awareness
- Policy actors
The figure bellow gives an artist illustration of the elements leading to a future European Response Service which could be delivered by the European Civil Protection Rapid Reaction Force mentioned above.

List of Websites:
See also attached file
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Powiązane dokumenty

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