# First year - ACS.XT

## USR - User Roles and access management

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| IC-111 - As an Anonymous User, I want to login to the system with a specific user |
| Only logged user can access the system. |

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| IC-115 - As an ICARO.XT Admin, I want to manage users and roles |
| The system allows to the supervisor users to create, read, update, and delete (CRUD) users. |

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| IC-113 - As an ICARO.XT Admin, I want to assign rights to users |
| The supervisor can assign specific rights to users.  The system includes a list of right sets, each associated to an ICARO.XT functionality. For example: aircraft maintenance activity planning, aircraft maintenance activity tracking, cockpit scheduling, cabin scheduling, …  The system may offer and intermediate level of configuration to facilitate the assignment of multiple right sets to specific user. For instance, the rostering label includes cockpit and cabin rostering right sets |

## USR - Multi-user

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| IC-108 - [NEW-STORY] As an ICARO.XT User, I want to access in read-only mode the scenarios in use by other users |
| The user can access to scenarios where other users are currently working with read-only rights |

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| IC-109 - [NEW-STORY] As an ICARO.XT User, I want the system to close a scenario after n minutes of user inactivity |
| The system implements a timeout for user scenarios sessions |

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| IC-648 - [NEW-STORY] As an ICARO.XT User, I want to collaborate with other users on the same scenario |
| The system provides tools to maintain data consistency |

## CDR - Regulation Configuration

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| IC-198 - As an ICARO.XT User, I want regulation parameters to be accessible |
| Cockpit and Cabin regulation are shown separately. |

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| IC-79 - As an ICARO.XT User, I want the system to use different regulations for Cockpit and Cabin crew |
| The software can manage different regulation types:   * + cockpit, for captain and pilot   + cabin, for flight attendants |

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| IC-10 - As a Scheduling Supervisor, I want to manage scheduling regulation parameters |
| The user can modify the parameters of  Cockpit and Cabin regulations related to scheduling activities.    Cockpit and Cabin regulation are similar, but they may differ for few parameters.    The user can define a waiver for each rule with a deadline (i.e. it is valid for n days, weeks, months or seasons). The waiver can disable the rule or set new thresholds.    The user can copy and compare the parameters from these regulations.    Example of regulation EASA 83/2014 parameters:     * + max flight duty period (FDP)   + Minimum rest period away from main base   + Limitation 10h duty with night duties (FRM not implemented) |

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| IC-433 - As an ICARO.XT user, I want to update regulation parameters in hypothetical scenarios |
| Users can modify regulation parameters only in hypothetical scenarios |

## CDR - Contract Configuration

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| IC-470 - As an ICARO.XT, I want contract parameters to be accessible |
| Cockpit and Cabin contracts are shown separately. |

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| IC-78 - As an ICARO.XT, I want the system to use different contracts for Cockpit and Cabin crew |
| The system is able to manage a contract for cockpit crew (i.e. captains and pilots) and one for cabin crew (i.e. flight assistants) |

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| IC-2 - As a Scheduling Supervisor, I want to manage scheduling contract parameters |
| The user can modify the parameters of  Cockpit and Cabin contracts related to scheduling activities.  Cockpit and Cabin contracts are similar, but they may differ for few parameters.  The user can define a waiver for each rule with a deadline (i.e. it is valid for n days, weeks, months or seasons). The waiver can disable the rule or set new thresholds.  The user can copy and compare the parameters from these contracts.  Examples of contract parameters:   * + contract category: cockpit and cabin   + main base   + max flight duty period (FDP)   + minimum rest |

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| IC-472 - As an ICARO.XT user, I want to update contract parameters in hypothetical scenarios |
| All the user can modify regulation parameters in hypothetical scenarios |

## CDR - Company Restriction Configuration

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| IC-260 - As an ICARO.XT user, I want company restriction parameters to be accessible |
| The system shows company restrictions |

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| IC-261 - As a Scheduling Supervisor, I want to manage scheduling company restriction parameters |
| The user can create, modify and delete company restriction related to specific flights and airports.  The system offers a list of company restriction constraint types which are customisable by the user  Example of company restrictions:   * + A pairing cannot include 5 landing in Cluj because it is too stressful for the crew |

## CDR - Margin Configuration

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| IC-475 - As an ICARO.XT User, I want margin parameters to be accessible |
| The system shows scheduling and rostering margins of a specific:   * + regulation   + contract   + company restriction set |

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| IC-374 - As a Scheduling Supervisor, I want to manage scheduling margin parameters |
| The user can create, modify, and delete margins related to:   * + regulations   + contracts   + airports   + aircraft types   The margin must be tighter than the related constraint.  The margin is a property of the parameter. The user may not set the margins for all the parameters.  The margins are related to a specific regulation, contract, company restriction parameters |

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| IC-477 - As an ICARO.XT User, I want to manage margin parameters in hypothetical scenarios |
| All the user can create, modify, and delete margin parameters in hypothetical scenarios |

## CDR - Airport Configuration

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| IC-238 - As an ICARO.XT User, I want airport parameters to be accessible |
| The user can access to all the available information of airports.    Example of airport details:     * + IATA Code   + Name   + Time Zone   + Briefing/Debriefing time   + Local or International   + Maintenance info   + Ground transfer settings   + Airport coordination slots:     - level 1 not coordinated     - level 2 facilitated     - level 3 coordinated |

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| IC-253 - As an ICARO.XT Admin, I want to manage airports |
| Only a supervisor can create, modify, and delete (CRUD) airports.  The system offers a simple workflow to populate airport parameters. The users can fill only the information related to their specific part |

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| IC-15 - As Scheduling Supervisor, I want to manage scheduling airport parameters |
| The user can add, modify and delete airport details useful for scheduling steps |

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| IC-24 - As Rostering Supervisor, I want to manage rostering airport parameters |
| The user can add, modify and delete airport details useful for rostering steps |

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| IC-576 - As an ICARO.XT User, I want to look for airports with specific characteristics |
| The system offers a flexible search functionality for airports based on their characteristics |

## CDR - Aircraft Configuration

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| IC-241 - As an ICARO.XT user, I want aircraft parameters to be accessible |
| The user can access to all the available information of each aircraft including aircraft type parameters |

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| IC-309 - As an ICARO.XT Admin, I want to manage aircraft types |
| Only a supervisor can create, modify, and delete (CRUD) aircraft types.  Example of aircraft type details:   * + name (e.g. Airbus A380, Embrear 190)   + business and economy seating   + minimum and standard crew composition   As opposed to ICARO, ground transfers and simulation activities are not aircraft types |

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| IC-254 - As an ICARO.XT Admin, I want to manage aircraft |
| Only a supervisor can create, modify, and delete (CRUD) aircraft |

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| IC-491 - As a Scheduling Supervisor, I want to manage aircraft parameters related to scheduling activities |
| Scheduling user can access all the information related to a specific aircraft, but it can create, modify, delete (CRUD) only the part related to pairings. |

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| IC-577 - As an ICARO.XT User, I want to look for aircrafts with specific characteristics |
| The system offers a flexible search functionality for aircraft based on their characteristics |

## SCH - Flight management

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| IC-19 - As a Scheduling User, I want aircraft activities to be visible |
| The system shows rotation information like:     * + aircraft IDs   + aircraft name   + aircraft type     It also shows aircraft activities and their details.    For instance, the system could show the following activities:     * + Flights     - aircraft (rotation) IDs     - ID     - departure and arrival time     - departure and arrival airports   + Maintenance activities     - aircraft IDs     - maintenance activity IDs     - start and end times     - airports     - On-ground activities     - aircraft IDs   + On-ground activity IDs     - start and end times     - airports |

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| IC-27 - As a Scheduling User, I want to manage aircraft activities and rotations |
| The users can easily create, modify, assign to rotations, and delete aircraft activities like flights and training.  They can also create, read, update, and delete rotations.    The system allows to swap flights and other aircraft activities in an intuitively manner. |

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| IC-479 - As a Scheduling User, I want flight activity details to be accessible |
| The system shows different details based on aircraft activity types.  For instance, the details for a flight can be:   * + ATFM restriction   + notes   + priority |

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| IC-480 - As a Scheduling User, I want to modify the level of detail in the flight overview |
| The system offers different zoom over the pairing overview: from hours to multiple days |

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| IC-481 - As a Scheduling User, I want to apply filters to aircraft activities |
| The user can filter official flights, maintenance activities and other usages based on his/her needs.    The system allows to extract the filtered aircraft activities in a suitable data format.    The user can filter aircraft activities on:     * + activity type   + airports   + date and time   + active MEL limitations in the current planning period   + others |

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| IC-482 - As a Scheduling User, I want to manage remarks to rotations and flight activities |
| The user can add a (plain text) note to rotations and flight activities and share them with other users |

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| IC-221 - As a Scheduling User, I want to manage abstract rotations |
| The user can create, modify, and delete abstract rotations |

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| IC-478 - As a Scheduling User, I want the system to summarize the current filtered aircraft activities |
| The system can produce summaries related to aircraft activities based on the filters applied to the aircraft activity overview |

## SCH - Algorithm

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| IC-66 - As a Scheduling User, I want the system to propose one or more scheduling solutions for a set of flights (and a set of fixed aircraft activities) |
| The system calculates one or more scheduling solution with the goal of creating pairings for all the flights.  The user can set the number of created solution |

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| IC-8 - As a Scheduling User, I want to manage the KPIs which group the weights taken into consideration by the scheduling algorithm |
| The user can tune the algorithm based on business-oriented criteria.  A KPI is a combination of weights.  Example of scheduling KPIs:   * + crew welfare   + economic cost   + service punctuality |

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| IC-530 - As a Scheduling Supervisor, I want to modify the weight parameters of the scheduling algorithm |
| The user can modify the weights using an intuitive interface.    For instance, the scheduling algorithm weights can be associated with:     * + nights in a pairing   + deadheads and proceeding to flights   + ground transfers   + aircraft changes |

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| IC-55 - As a Scheduling User, I want the system to handle multiple home bases |
| The algorithm takes into account the user preferences regarding the distribution of pairings over home bases |

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| IC-56 - As a Scheduling User, I want the system to handle C-D classified airports |
| The system will try to group flights with arrivals and departures in a C-D classified airport (for instance, Florence) into the same pairings.    Airport classification:   * + A, no training requested   + B, self training   + C- D, specific training / abilitations     The user can define at most 2 C-D classified airports. |

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| IC-553 - As a Scheduling User, I want to lock pairings and flights so that the algorithm does not take them into account for the scheduling solutions |
| The proposed scheduling solutions do not include locked flights and pairings |

## SCH - Pairing Management

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| IC-310 - As a Scheduling User, I want pairings to be visible |
| The system shows the pairings and their details like.    Each pairing is characterized by a set of values like:     * + flights   + deadheads and proceeding to flights   + ground transfers   + Flight Hours   + Service Hours   + FDP     The definition of pairing IDs may be based on pairings characteristics.    For instance, the pairing ID is composed of 4 alphanumeric chars: the first one represents aircraft type, the second one the duration in days of the pairings, … |

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| IC-82 - As a Scheduling User, I want pairing details to be accessible |
| The system shows the details of a selected pairing like:     * + Flight Duty Period (FDP)   + acclimatisation   + Time zones   + Service Hours,   + Flight hours   + Rest time |

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| IC-17 - As a Scheduling User, I want to manage pairings |
| The users can create, modify, split, merge, duplicate, and delete pairings.    For instance, they can:     * + create/delete pairings   + add/remove a scheduling activity (flight, training, deadhead, proceeding to flight, and ground transfer) to a pairing   + swap scheduling activities between pairings |

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| IC-25 - As a Scheduling User, I want to look for deadheads and proceeding to flights |
| The system helps the user to look for flights (and combination of them) of other airlines to use as deadheads and proceeding to flights.    It uses third party services (e.g. Amedeus Altea, Lufthansa open API) to request information of (and to book) other company flights. |

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| IC-73 - As a Scheduling User, I want to apply filters to pairings |
| The user can filter pairings based on several parameters like:   * + Date and time   + Aircraft type   + Airports   + Minimum rest   + Quality (Invalid, pending and tight) |

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| IC-580 - As a Scheduling User, I want the system to summarize the current filtered pairings |
| The system can produce summaries related to pairings based on filters applied to the pairing overview |

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| IC-599 - As a Scheduling User, I want to identify convertible base pairings |
| A convertible base pairing is pairing for which exists at least another home base that can replace the original one satisfying planning and tracking constraints and maintaining the same number of shift days.    The user can change the home base for these pairings.    The system shows this type of pairing in a different way. |

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| IC-607 - As a Scheduling User, I want the system to provide statistical information based on previous published solutions |
| The system analyses historical data and shows statistical information.  The user can use this information to manually improve the scheduling solutions |

## SCH - Pairing Validation

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| IC-83 - As a Scheduling User, I want the system to mark pairings violating non-derogable rules as INVALID |
| The system labels a pairing violating non-derogable regulation or contract rules as INVALID.    Violation reasons are shown (and explained) in a human readable manner. |

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| IC-84 - As a Scheduling User, I want the system to mark pairings violating derogable rules as PENDING |
| The system labels a pairing violating a derogable regulation or contract rules as PENDING.    A PENDING pairing can be approved by the supervisor and/or by the captain assigned to it.    Violation reasons are shown (and explained) in a human readable manner. |

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| IC-85 - As a Scheduling User, I want the system to mark pairings violating margins as TIGHT |
| A solution with margin violations can be forwarded to the rostering phase.  Violation reasons are shown (and explained) in a human readable manner. |

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| IC-90 - As a Scheduling User, I want to manage unassigned flights |
| The system shows and highlights the flights not included in the scheduling solution (i.e. flights not belonging to pairings) |

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| IC-148 - As a Scheduling User, I want to manage critical pairings |
| A pairing is labelled as critical if more of the 33% of similar pairings (same flights) present delays in the previous season.  The system shows and highlights critical pairings and they cannot be forwarded to the rostering phase |

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| IC-485 - As a Scheduling User, I want the system to automatic validate every change of the pairing solution performed by myself |
| The system analyses user actions in order to identify violations |

## SCH - Scenario Creation

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| IC-98 - As a Scheduling User, I want to manage production scheduling scenario |
| The users can create a production scheduling scenario only based on official flights.  They can also create a new scenario based on the current one (like the “save as” command).  The system offers default commands like:   * + new   + open   + save   + save as   + close   The user cannot modify the flight network.  An optional step for the creation of a tracking scenario is the selection of a reason code over a set of elements. The users can change the reason code within the publication step. |

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| IC-97 - As a Scheduling User, I want to manage a hypothetical scheduling scenario |
| The users can create a hypothetical scheduling scenario starting from a flight network (official or a SSIM file).    They can also create a new scenario based on the current one (like the “save as” command).    The system offers default commands like:     * + new   + open   + save   + save as   + close     The hypothetical scheduling scenario allows the user to change the parameters of:     * + regulations   + contracts   + flights   + airports   + aircrafts     An optional step for the creation of a tracking scenario is the selection of a reason code over a set of elements. The users can change the reason code within the publication step. |

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| IC-21 - As a Scheduling User, I want the system to handle adjoining activities |
| The activities that are assigned over two temporal periods (usually months) are automatically added to the scenarios |

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| IC-496 - As a Scheduling User, I want to specify the planning period |
| When I create a scenario, I want to be able to specify the time window I want to plan.  The specified interval must be a subset of the time period covered by the flight network. |

## SCH - Scenarios

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| IC-63 - As Scheduling User, I want to access to an evaluation report of the pairing solution |
| The report shows a qualitative and quantitative summary of the proposed solution.  For example, the report can contain:   * + assigned and unassigned flights   + total amount of pairings   + total amount of duties   + aircraft changes   + overnights per airport per day |

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| IC-103 - As a Scheduling User, I want to compare scenarios |
| The system shows a set of information useful to compare two or more scenarios:     * + evaluation report   + Money machine   + Man power |

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| IC-350 - As a Scheduling User, I want other users to approve a given scheduling scenario |
| A scenario may include changes that are related to other user roles.  Before the publication, a scheduling user can ask an evaluation to other users/groups/departments. |

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| IC-86 - As a Scheduling User, I want to promote the pairing solution only if it comes from a production scenario and passes the validation process |
| A scheduling solution cannot be promoted if it contains invalid or pending pairings. |

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| IC-122 - As a Scheduling User, I want to manage data inconsistency between official and current data |
| The user can update current data with the official one and the system re-validates the solution |

## SCH - Manpower

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| IC-50 - As a Scheduling User, I want the system to estimate the FTE cost of a pairing solution |
| FTE or Full Time Equivalent is a unit of measure of an employee's or group's productivity. An FTE of 1.0 means that the person, or group of people, is equivalent to a full-time worker.  The user can define the period for FTE estimation. |

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| IC-51 - As a Scheduling User, I want the system to compare the FTE cost of a pairing solution with FTEs available in the company for a given period |
| The available company FTEs are estimated based on the following parameters:   * + total amount of employees, divide by contract time (full-time and part-time)   + Training days   + Holidays and rest   + Absences   Alt Text  The user can define the period for FTE estimation |

## SIM - Simulator Management

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| IC-132 - As a Simulator User, I want to manage confirmed simulator sessions |
| The user can create, modify, and delete simulator sessions confirmed by the airports.  The system may import the confirmed simulator sessions from files or offer an intuitive GUI to add these sessions |

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| IC-133 - As a Simulator User, I want simulator pairings to be visible |
| The system shows the simulator pairings that are composed of:     * + crew members   + simulator activities   + deadheads and proceeding to flights   + ground transfers |

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| IC-486 - As a Simulator User, I want simulator pairing details to be accessible |
| The system shows the details of a simulator pairings.  For instance, these details can be:   * + Training type   + deadhead and proceeding to flight tickets   + accommodation reservations   + crew member information   The user can request the list of hotel reservations |

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| IC-135 - As a Simulator Supervisor, I want to manage simulator activity types |
| The user can create, modify, and delete simulator activity types like TPC and Operator Proficiency Check (OPC)  Each type is characterized by:   * + id   + name   + description   + duration   + crew composition (captains, pilots, instructors)     - for each crew categories, the user can define if the session is part for the crew member evaluation or not   + briefing and debriefing time   + other parameters |

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| IC-142 - As a Simulator User, I want to manage simulator pairings |
| The users can create, modify and delete pairing containing simulator activities.  For instance, they can:   * + create/delete pairings   + add/remove a scheduling activity (simulator session, deadhead, proceeding to flight, and ground transfer) to a pairing   + add other crew members   + look for and book deadheads and proceeding to flights   + book accommodations   + set as exam for a specific crew member |

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| IC-137 - As a Simulator User, I want the system to mark roster activities violating non-derogable rules as INVALID |
| The system labels a simulation pairing violating non-derogable regulation or contract rules as INVALID.    Violation reasons are shown (and explained) in a human readable manner |

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| IC-138 - As a Simulator User, I want the system to mark simulator pairings violating derogable rules as PENDING |
| The system labels a simulator pairing violating a derogable regulation or contract rules as PENDING.    A PENDING simulator pairing can be approved by the supervisor and/or by the captain assigned to it.    Violation reasons are shown (and explained) in a human readable manner. |

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| IC-487 - As a Simulator User, I want the system to automatic validate every change of simulation pairings performed by myself |

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| IC-488 - As a Simulation User, I want to promote a simulation pairing solution only if they pass the validation process |
| A simulation pairing solution cannot be promoted if it contains invalid or pending simulation pairings.    The system automatically notifies to crew members the months of their planned simulation sessions |

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| IC-490 - As a Simulation User, I want to access to an evaluation report of the simulation pairing solution |
| The report shows a qualitative and quantitative summary of the proposed solution. |

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| IC-635 - [NEW-STORY] As a Simulation User, I want to apply filters to simulator pairings |
| The user can filter simulator pairings based on several parameters like:   * + Date and time   + Crew members   + Airports   + Simulation session status: pending, confirmed |

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| IC-636 - [NEW-STORY] As a Simulation User, I want the system to summarize the current filtered pairings |
| The system can produce summaries related to pairings based on filters applied to the pairing overview |

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| IC-637 - [NEW-STORY] As a Simulation User, I want to manage remarks to simulator pairings |
| The user can add a (plain text) note to a simulator pairing and share it with other users |

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| IC-638 - [NEW-STORY] As a Simulation User, I want the system to estimate the amount of simulation sessions needed in a given period |
| The system estimates the amount of simulation sessions needed in a given period based on licence renewal and revalidation processes and promotion courses (e.g. from pilot to captain) |

## OPM - Operation Management

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| IC-314 - As an ICARO.XT User, I want to hand over tasks to other users |
| The users can assign tasks to other operators.  The handover can include a scenario and a list on remarks (daily report) |

## ALR - Alert Manager

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| IC-74 - As a Scheduling User, I want the system to notify me when the network office requires the evaluation and the approval of a flight network change |
| The network office can:   * + send a flight update   + require an evaluation of a potential change in the flight network.   The scheduling user can create a scenario to simulate the new situation and then approves, refuses or propose an alternative solution. |

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| IC-322 - As a MCC User, I want the system to notify me of INVALID, PENDING, and TIGHT maintenance activities |
| Non-complaint maintenance activities are shown in the alert manager overview |

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| IC-319 - As a Scheduling User, I want the system to notify me of critical pairings |
| A pairing is defined critical if more of 33% of pairings, containing the same flights, have violated the regulations |

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| IC-324 - As an ICARO.XT User, I want to apply filters to alert messages |
| The system shows alert messages to users based on their roles.  The user can filter alert messages based on several parameters like:   * + Date and time   + Aircraft type   + Airports   + Crew member   + Quality: invalid, pending and tight   For instance, a scheduling user may want to check only INVALID pairings including a specific pilot |

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| IC-494 - As an ICARO.XT Admin, I want to configure alerts |
| The user can prioritise the alert types and specify notice periods.  For instance, the system defines three level of priority: green, yellow, and red. The user can set to each alert type a priority level.  In the tracking phase, the priority can change during the timeline.  For instance, if the expiration date of a crew member licence is next month, his priority level is low, while if licence is already expired, the priority level is high. |

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| IC-89 - As a Scheduling User, I want the system to notify of me the inconsistencies between official data and data used in the current scenario |
| The system identifies the difference between official and current data related to:   * + Flights   + Regulation parameters   + Contract parameters   + Margin parameters   + Airport parameters   + Aircraft parameters   These inconsistencies can be due to parameter updates by supervisors |

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| IC-507 - As an ICARO.XT User, I want the system to notify me if another user has requested my evaluation (and approval) of a given scenario |
| A scenario may include changes that are related to other user roles.  A user can ask the evaluation and the approval of other users respect to a given scenario.  For example, the network office can:   * + send a flight update   + require an evaluation of a potential change in the flight network.   The scheduling user can create a scenario to simulate the new situation and then approves, refuses or propose an alternative solution. |

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| IC-510 - As an ICARO.XT User, I want the system to notify me of handovers coming from other users |
| The users receive the handovers assigned by other users.  The handover can include a scenario and a list on remarks |

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| IC-526 - As an ICARO.XT Admin, I want to manually close an alert |
| The supervisor user can manually close (i.e. marking as completed or deleted) an alert. |

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| IC-628 - [NEW-STORY] As a Scheduling User, I want the system to notify me of new night stop locations |
| The system identifies new night stop location respect to the previous time period in order to look for accommodations |

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| IC-632 - [NEW-STORY] As a Scheduling User, I want the system to notify me of rotation continuity inconsistencies |
| A rotation must satisfy the continuity of operations: the departure airport of a given flight is equal to the arrival airport of the previous flight; moreover, its departure time is later than the arrival time of the previous flight.  It includes also the night stop: the arrival airport of the last flight of a given day must be equal of the departure airport of the first flight of the next day |

## MON - Money Machine

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| IC-45 - As a Scheduling User, I want the system to estimate the economic cost of a pairing scenario |
| The system can calculate the economic cost of a given pairing scenario. |

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| IC-46 - As a Scheduling User, I want to manage the economic cost parameters |
| The user can modify the parameters necessary to evaluate the economic cost of a pairing scenario.  Example of cost parameters:   * + Crew (cockpit and cabin)     - Flight ours   + Accommodations     - Average cost per night     - Average cost per shuttle   + Deadheads and proceeding to flights     - Air Dolomiti flights (0€)     - other flights (ticket prize from MyIdTravel)   + Simulator activities     - Average cost per hour |

## ICC - Integration with ICARO

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| IC-250 - As Scheduling User, I want to export the flights in an ACM (ICARO) suitable format |
| ACS.XT component can export the flight network in a format compatible with ICARO |

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| IC-251 - As Scheduling User, I want to export the pairing solution in an ACM (ICARO) suitable format |
| ACS.XT component can export the paring solution in a format compatible with ICARO |

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| IC-627 - [NEW-STORY] As a Scheduling User, I want to import aircraft activities defined in ACM |
| The system can import the aircraft activities (flights and maintenance activities) coming from ACM |

# Second year - ACR.XT

## CDR - Regulation Configuration

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| IC-194 - As Rostering Supervisor, I want to manage rostering regulation parameters |
| The user can modify the parameters of  Cockpit and Cabin regulations related to crew rostering activities.  Cockpit and Cabin regulation are similar, but they may differ for few parameters.  The user can define a waiver for each rule with a deadline (i.e. it is valid for n days, weeks, months or seasons). The waiver can disable the rule or set new thresholds.  The user can copy and compare the parameters from these regulations. |

## CDR - Contract Configuration

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| IC-200 - As a Rostering Supervisor, I want to manage rostering contract parameters |
| The user can modify the parameters of  Cockpit and Cabin contracts related to crew rostering activities.  Cockpit and Cabin contracts are similar, but they may differ for few parameters.  The user can define a waiver for each rule with a deadline (i.e. it is valid for n days, weeks, months or seasons). The waiver can disable the rule or set new thresholds.  The user can copy and compare the parameters from these contracts. |

## CDR - Company Restriction Configuration

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| IC-262 - As a Rostering Supervisor, I want to manage rostering company restriction parameters |
| The user can create, modify and delete company restriction related to crew activities.  The system offers a list of company restriction constraint types which are customisable by the user |

## CDR - Margin Configuration

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| IC-204 - As a Rostering Supervisor, I want to manage rostering margin parameters |
| The user can add, modify, and delete margins related to:   * + regulations   + contracts   + crew activities   The margin must be tighter than the related constraint.  The margin is a property of the parameter. The user may not set the margins for all the parameters.  The margins are related to a specific regulation, contract, company restriction parameter |

## CDR - Aircraft Configuration

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| IC-492 - As a Rostering Supervisor, I want to manage aircraft parameters related to crew activities |
| Rostering user can access all the information related to a specific aircraft, but it can create, modify, delete (CRUD) only the part related to crew activities. |

## CDR - Crew Configuration

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| IC-391 - As an ICARO.XT User, I want crew member details to be accessible |
| The system shows crew member information like   * + Surname   + Name   + Serial number   + First day of work   + Last day of work   + Remaining holidays   + passport   + contract type   + email   + telephone number   + training   + licences   + others |

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| IC-456 - As a Crew Supervisor, I want to manage enemy crews |
| The user can add, modify and delete enemy crew for each crew member.  The rostering algorithm cannot assign enemy crew member to the same pairing |

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| IC-498 - As a Crew Supervisor, I want to manage training profiles |
| I want to be able to define and assign training profiles to crew members.    Training profiles needs to be taken into consideration by the system. |

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| IC-549 - As an ICARO.XT User, I want to manage crew members without a company user ID |
| The system can manage crew members that are waiting for an ID.  HR office can assign IDs to persons only if they have a contract with the company. There are cases where ICARO.XT users have to plan the activities of people without a contract (e.g. training period of new candidate pilots) |

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| IC-558 - As an ICARO.XT User, I want the system to synchronize ICARO.XT crew information with the Human Resource software |
| The system synchronizes crew personal data (e.g. address and telephone number) stored in ICARO.XT with Human Resource software |

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| IC-578 - As an ICARO.XT User, I want to look for crew members with specific characteristics |
| The system offers a flexible search functionality for crew members based on their characteristics |

## ROS - Crew Activity configuration

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| IC-183 - As a Rostering User, I want to access crew activity types details |
| The software shows the crew activity parameters in an intuitive manner |

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| IC-182 - As a Rostering Supervisor, I want to modify crew activity parameters |
| Example of crew activity parameters:   * + ID   + name   + duration |

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| IC-397 - As a Rostering Supervisor, I want to manage crew activity types |
| The user can create, modify, and delete activity types.    Each type is characterized by:   * + id   + name   + description   + duration   + other parameters     The activity types can be grouped into categories like flight duties, training and office duties |

## ROS - Roster Management

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| IC-164 - As a Rostering User, I want planned crew activities to be visible |
| The system shows the activities assigned to each crewman.  The activities can be assigned to a specific crewman by:   * + the operators   + the algorithm   + the long-term optimizer |

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| IC-186 - As a Rostering User, I want to import activities assigned to a specific crewman from third-party tools |
| Other tool might send specific crew activities to ICARO.XT like bidding, rest, and holidays. |

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| IC-162 - As a Rostering User, I want the history of actual crew activities to be accessible |
| The system shows crew activities performed in the past |

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| IC-163 - As a Rostering User, I want to modify the level of detail in the crew rostering activity overview |
| The software offers multiple zoom over the crew shifts:   * + daily level, like to the overview in ICARO   + hourly level, it shows the activity of each hour of the day |

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| IC-165 - As a Rostering User, I want to look for crew members |
| The software offers a basic and an advances search function.    For examples, they system could allow to the user to look for:     * + a specific crew member   + a subset of members   + all crew members assigned to a specific pairing   + all crew members assigned to a set of pairings |

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| IC-167 - As a Rostering User, I want to manage a subset of crew members |
| The user can work on a subset of crew members select by contract, training level, licences, a combination of them.  However, the user cannot run the rostering algorithm for a crew member subset because it must guarantee a uniform distribution of crew activities over the whole crew |

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| IC-166 - As a Rostering User, I want to manage unassigned and partially assigned pairings |
| A pairing without a crew is labelled as unassigned.    While a pairing with an incomplete crew is labelled as partially assigned. For instance, a pairing with an assigned crew composed of a captain, 3 cabin assistants but not the pilot, is labelled as partially assigned.    The system shows unassigned and partially assigned pairings and offers the functionalities to assign crew member to pairings. |

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| IC-438 - As a Rostering User, I want to perform operations on pairings related to crew members |
| The user can operate on the relationship between pairings and crew members.  For instance, the user can modify the crew composition of a specific pairing:   * + add extra crew members (e.g. pilots, instructors and examiners)   + add supernumerary employees (e.g. technicians and not on duty crew members) |

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| IC-437 - As a Rostering User, I want to assign labels to crew members |
| The user can create a label in order to represent a specific crew features and to group crew member |

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| IC-170 - As a Rostering User, I want to access specific information related to each crew member |
| The software shows few information for each user. For instance:     * + contract type   + licences   + FDP (Flight Duty Period)   + early postponed summer leaves     The user may select optional information to show |

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| IC-168 - As a Rostering User, I want to manage remarks to crew members |
| The user can add a (plain text) note to a crew member and share it with other users |

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| IC-175 - As a Rostering User, I want to swap pairings between crewmen |
| The user can manually select the pairings to swap.  Given an assigned pairing, the system may suggest the most suitable pairings to swap based on specific variables (selected by the user). For instance, greater or lesser pairing Flight Duty Period (FDP), earlier or later pairing starting time, etc. |

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| IC-534 - As a Rostering User, I want to manage ineligible (or partially ineligible) to flight crew members |
| The system shows all the roster activities (pairing included) affected by ineligible to flight crew members.  Crew members become ineligible for their assigned roster activities when:   * + they have an Operational multi-crew limitation (OML) limitation   + they call sick   + their medical and cosmic radiation examinations are expired   + their flight licences are expired   + their flight qualifications are expired   An ineligible to flight crew member cannot be associated with crew activities related to flights |

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| IC-535 - As a Rostering User, I want to manage crew member incompatibilities |
| The system helps the user to avoid the creation of pairing containing incompatibilities between crew members like:   * + enemy crews   + IML limitations   + junior captain with junior pilot   + over 60 captain with over 60 pilot |

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| IC-540 - As a Rostering User, I want to manage crew member missions |
| A shift composed by n or more days without rest days in the home base is defined as mission (with n defined by the supervisor).    For example, a training course of two weeks can be labelled as a mission if the crew members do not go back to the home base during the weekend    The user can manually assign a specific label to these shifts |

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| IC-550 - As a Rostering User, I want to manage crew members without a company user ID |
| The system can manage crew members that are waiting for an ID.  HR office can assign IDs to persons only if they have a contract with the company. There are cases where ICARO.XT users must plan the activities of people without a contract (e.g. training period for new candidate employees) |

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| IC-581 - As a Rostering User, I want the system to summarize the current filtered rostering activities |
| The system can produce summaries related to roster activities.  For instance, a summary can include:   * + Training   + Illness   + Invalid and pending roster activities |

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| IC-602 - As a Rostering User, I want to manage crew rest days |
| The user can create, modify and delete rest days    The system helps the user to monitor taken, untaken and taken in advance rest days |

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| IC-608 - As a Rostering User, I want the system to provide statistical information based on previous published solutions |
| The system analyses historical data and shows statistical information.  The user can use this information to manually improve the rostering solutions.  For instance, the system can analyse planned and used stand-by duties |

## ROS - Algorithm

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| IC-424 - As a Rostering User, I want the system to propose a solution for the assignment of roster activities to crew members satisfying crew and global constraints |
| The algorithm calculates a roster solution assigning activities like pairings and rest days (taken, untaken, and taken in advance), to crew member taking into account long term planned activities and crew member limitations like sick days and OML.  It controls also crew member incompatibilities like:   * + enemy crew   + junior captain and junior pilot in the same pairing   + over 60 captain and over 60 pilot in the same pairing   + CA1/ CA2 abilitation missing for cabin crew |

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| IC-177 - As a Rostering User, I want the system to be able to produce a roster solution with a uniform distribution of specific activities over crew members |
| The main goal of the roster algorithm is the assignment of activities to crew members respecting variables like working hours, rest days and stand-by duties.  The user may set the boundaries of specific variables. For instance, the minimum and maximum number of rest days for a crew member in a month are 11 and 14 days, respectively. |

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| IC-451 - As a Rostering User, I want the algorithm takes into account crew preferences coming from the bidding process |

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| IC-180 - As a Rostering User, I want to manage the KPIs which group the weights taken into consideration by the rostering algorithm |
| The user can tune the algorithm based on business-oriented criteria.  A KPI is a combination of weights.  The system offers an intuitive interface to modify the weights  The users can prioritize and weight KPI in order to obtain a roster solution more suitable for their needs.  Example of KPIs:   * + crew welfare (distribution of rest days, distribution of morning and afternoon shifts)   + crew bidding   + economic costs |

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| IC-178 - As a Rostering User, I want a roster solution which takes into account multi-contracts crew |
| The system is able to assign activities to crew member respecting the constraints of different contracts (including company restrictions and margins) |

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| IC-184 - As a Rostering User, I want the system to be able to delete revocable activities and move movable activities |
| Crew activities are classified:   * + Final (mandatory to fly and not movable)     - Doctor appointments (medical examinations)     - Flight exams   + Revocable (not mandatory to fly and not movable)     - Holidays   + Movable (mandatory to fly and movable in a specific time period)     - training     - simulators     The activities added by human resources and planning department are Final.  The system can delete Revocable activities and move Movable activities |

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| IC-531 - As a Rostering Supervisor, I want to modify the weight parameters of the rostering algorithm |
| The user can modify the weights using an intuitive interface.  For instance, the rostering algorithm weights can be associated with:   * + flight hours   + working hours   + crew member satisfaction |

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| IC-551 - As a Rostering User, I want the system to handle C-D classified airports |
| The system will try to distribute pairings containing flights with arrivals and departures in a C-D classified airport (for instance, Florence) over crew members.  Airport classification:   * + A, no training requested   + B, self-training   + C- D, specific training / abilitations   The user can define at most 2 C-D classified airports. |

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| IC-554 - As a Rostering User, I want to lock assigned crew activities so that the algorithm does not take them into account for rostering solutions |
| The proposed rostering solutions do not include locked crew activities |

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| IC-566 - As a Rostering User, I want the system to handle crew members with different contracts during the creation of a roster solution |
| The system is able to create a roster solution assigning activities to crew members based on their contract (multi-contract feature). |

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| IC-601 - As a Rostering User, I want to identify convertible base pairings |
| A convertible base pairing is pairing for which exists at least another home base that can replace the original one satisfying planning and tracking constraints and maintaining the same number of shift days.    The user can change the home base for these pairings.    The system shows this type of pairing in a different way. |

## ROS - Roster Validation

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| IC-206 - As a Rostering User, I want the system to mark roster activities violating non-derogable rules as INVALID |
| The system labels a roster activity assigned to a specific crew member violating non-derogable regulation or contract rules as INVALID.    Violation reasons are shown (and explained) in a human readable manner |

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| IC-207 - As a Rostering User, I want the system to mark roster activities assigned to specific crew members violating derogable rules as PENDING |
| The system labels a roster activity assigned to a given crew member violating a derogable regulation or contract rules as PENDING.    A PENDING crew activity can be approved by the supervisor and/or by the captain assigned to it.    Violation reasons are shown (and explained) in a human readable manner |

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| IC-208 - As a Rostering User, I want the system to mark roster activities violating margins as TIGHT |
| A solution with margin violations can be published.  Violation reasons are shown (and explained) in a human readable manner. |

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| IC-211 - As a Rostering User, I want the system to automatic validate every change of the rostering solution performed by myself |
| The system analyses user actions in order to identify violations |

## ROS - Rostering Publication

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| IC-231 - As a Rostering User, I want to publish as official a production rostering scenario |
| The system publishes a scenario as official rostering solution only if it is a production scenario (official parameters) and passes the validation step |

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| IC-363 - As a Rostering User, I want the system to pre-book deadheads and proceeding to flights as post-publication step |
| The system automatically pre-books deadheads and proceeding to flights based on the planning solution.    Deadhead and proceeding to flight tickets are issued x hours before the flights. |

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| IC-364 - As a Rostering User, I want the system to book accommodations and shuttle services as post-publication step |
| The system automatically books accommodation and shuttle services based on the planning solution |

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| IC-365 - As a Rostering User, I want the system to book ground transfers between airports as post-publication step |
| The system automatically books ground transfers between airports based on the planning solution |

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| IC-399 - As a Rostering User, I want the system to identify pairings in which assigned crew members are entitled to order airline crew meals as post-publication step |
| The system publishes (to third-party tools) the list of crew member that have the right to request meals.    Third-party tools allow to the crew member to choose and book the meals |

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| IC-626 - [NEW-STORY] As a Rostering User, I want the system to define priority rest days |
| The system sets 3 rest days as priority.  The user can alter these rest days only with 5 days of notice |

## ROS - Scenarios

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| IC-219 - As a Rostering User, I want to manage production rostering scenario |
| The user can create a production rostering scenario only on the basis of a production scheduling scenario.    Users can also create a new scenario based on an existing one (like the “save as” command).    The system offers default commands like:     * + new   + open   + save   + save as   + close     An optional step for the creation of a tracking scenario is the selection of a reason code over a set of elements. The users can change the reason code within the publication step. |

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| IC-225 - As a Rostering User, I want to manage a hypothetical rostering scenario |
| The users can create a hypothetical rostering scenario on the basis of a production or hypothetical scheduling scenario maintaining their configurations.    They can also create a new scenario based on the current one (like the “save as” command).    The system offers default commands like:     * + new   + open   + save   + save as   + close     The hypothetical rostering scenario allows to the user to change the parameters of:     * + regulation   + contract   + airport   + aircraft   + crew     An optional step for the creation of a tracking scenario is the selection of a reason code over a set of elements. The users can change the reason code within the publication step. |

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| IC-497 - As a Rostering User, I want to specify the planning period |
| When creating a scenario, the user can specify the time window to plan.    The specified interval must be a subset of the time period covered by promoted scheduling solution. |

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| IC-226 - As a Rostering User, I want the system to handle adjoining activities |
| The activities that are assigned over two temporal periods (usually months) are automatically added to the scenarios |

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| IC-217 - As a Rostering User, I want to know the estimated prize of the roster solution (including crew overtime) |
| The system publishes a report focused on the roster solution cost |

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| IC-289 - As Rostering User, I want to access to an evaluation report of the roster solution |
| The report shows a qualitative and quantitative summary of the proposed solution.  For example, the report can contain:   * + roster solution summary   + leaves   + accepted roster margins   + prefixed activities     - accepted     - cancelled   + evaluation     - total amount of working days/hours, leaves, holidays, … for each crewman     - the distribution of working hours, stand-by hours and leaves across the crew (and subset of it).   + estimation of overtime hours   + other |

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| IC-351 - As a Rostering User, I want other users to approve a given rostering scenario |
| A scenario may include changes that are related to other user roles.  Before the publication, a rostering user can ask an evaluation to other users/groups/departments. |

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| IC-505 - As a Rostering User, I want to compare scenarios |
| The system shows a set of information useful to compare two or more scenarios |

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| IC-513 - As a Rostering User, I want to manage data inconsistency between official and current data |
| The user can update current data with the official one (including pairings) and the system re-validates the solution. |

## ROS - Stand-by Management

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| IC-205 - As a Rostering User, I want to manage crew stand-by duties |
| The user can create, read, modify and delete stand-by duties.  A stand-by duty is characterized by:   * + reporting time: long (x hours), quick (y minutes)     - Air Dolomiti: long (3 hours), quick (50 minutes)   + Duration in days   + Airport Stand-by   + Reserve: to be noticed 10 h before the beginning (Regulation)     - not used in EN |

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| IC-440 - As a Rostering User, I want to define a pattern for stand-by duty creation |
| The system allows to define stand-by duties based on a specific pattern. |

## ROS - Long Term Planning

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| IC-436 - As a Rostering User, I want to manage crew part-times |
| The user can create, modify, assign, and delete part-times |

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| IC-188 - As a Rostering User, I want vertical part-times to be visible |
| The system shows the availability for each crewman |

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| IC-187 - As a Rostering User, I want the system to (uniformly) distribute vertical part-times (or other part-time types) over a given time period |
| The goal is to distribute the vertical part-time (1-2 weeks off, 2-3 weeks on) over the roster period in order to have similar crewman availability in the aforementioned period.  The system takes into account also the crew member part-time period preferences. |

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| IC-441 - As a Rostering User, I want to manage crew holidays and leaves including their authorization workflows |
| The users can create, modify, delete crew holidays and leaves.  They have the rights to accept and refuse crew holiday request. The user can create a hypothetical scenario to evaluate the effect of holidays over the working period.  The system shows requested but non-accepted holidays and leaves in a different way. |

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| IC-189 - As a Rostering User, I want crewman holidays to be visible |
| The system shows day offs and holiday requests for each crewman. |

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| IC-442 - As a Rostering User, I want to manage on-ground training and flight simulation duties |
| The user can create, modify, assign, and delete on-ground training and flight simulation duties |

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| IC-192 - As a Rostering user, I want on-ground training and flight simulation duties to be visible |
| The system shows on-ground training and flight simulation duties for each crew member |

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| IC-421 - As a Crew Planning User, I want to (uniformly) distribute crew licence activities over a given time period respecting existing deadlines |
| The system distributes crew licence activities (renewal and revalidation) over a time period respecting existing deadlines of crew members |

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| IC-413 - As a Crew Planning User, I want to (uniformly) distribute crew qualification activities over a given time period respecting existing deadlines |
| The system distributes crew qualification activities over a time period respecting qualification deadlines of crew members |

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| IC-416 - As a Crew Planning User, I want to (uniformly) distribute crew medical examinations respecting existing deadlines and crew preferences |
| The system distributes crew medical examinations over a time period respecting qualification deadlines of crew members.    The alcohol test is not included in this story |

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| IC-418 - As a Crew Planning User, I want to (uniformly) distribute crew cosmic radiation examinations over a given time period respecting existing deadlines and crew preferences |
| The system distributes crew cosmic radiation examinations over a specific time period |

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| IC-443 - As a Rostering User, I want to manage medical examinations |
| The user can create, modify, assign, and delete medical examinations.    List of possible medical examinations:   * + periodic   + additional   + cosmic radiation   + cosmic radiation additional   + periodic + cosmic radiation   + periodic + cosmic radiation additional   + additional + cosmic radiation   + additional + cosmic radiation additional   + alcohol test     - only for cockpit     - need to be scheduled as a ground activity |

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| IC-444 - As a Rostering User, I want medical examinations to be visible |
| The system shows the planned (and booked) medical examination for each crewman.  The system can print a list of crew members with booked medical examinations. The printable list may contain the following information:   * + name of the crew member   + surname of the crew member   + date of birth of the crew member   + place of birth of the crew member   + date and time of the medical examination |

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| IC-354 - As a Rostering User, I want to manager long term planning scenarios |
| Please refer to the epic ROS-Scenarios for the details |

## ROS - Crew Bidding

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| IC-455 - As a Rostering User, I want the system to calculate the current seniority for each crew member every month |
| The system calculates crew members’ current seniority which represent the level of satisfaction of crew member bidding requests. |

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| IC-542 - As a Rostering User, I want the system to receive crew preferences for flight activities and rest days obtained by the bidding process |
| The system receives crew preferences regarding days off (holidays, leaves and rest days) requests which are taken into account for the current seniority estimation  The system receives crew preferences regarding working activities like:   * + early pairings: starting before 8:00 am   + late pairings: starting after 8:00 am   + preferred night stop airports   + days off |

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| IC-453 - As a Rostering User, I want the system to receive crew preferences for no-flight activities obtained by the bidding process |
| The system receives crew preferences regarding days off (holidays, leaves, and rest days) requests which are taken into account for the current seniority estimation |

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| IC-454 - As a Rostering User, I want the system to receive crew preferences regarding flight duties |
| Crew member can define preferred flight duties (stopovers) during the bidding phase  For instance: a captain sets as preferred stopover Bologna. The rostering algorithm assigns to this captain a pairing composed by the following flights:   * + VRN-BLQ, proceeding to flight   + BLQ-MUC, flying   + Other flights   The system updates the pairing removing the proceeding to flight.  The system manages deadhead in an analogous manner |

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| IC-457 - As a Rostering User, I want the system to receive crew preferences regarding colleagues to flight with |
| Each crew member can choose another one as preferred colleague to flight with.  The system receives this information and the rostering algorithm takes into account these preferences during the roster planning solution |

## ALR - Alert Manager

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| IC-320 - As a Rostering User, I want the system to notify me of INVALID, PENDING, and TIGHT roster activities |
| Non-compliant roster activities are shown in the alert manager overview |

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| IC-321 - As a Rostering User, I want the system to notify me of unassigned or partially assigned pairings of the planning period |
| The rostering tool assigns pairings to crew members    The alert manager shows the pairings not assigned or partially assigned (3 out of 5) to crew member. |

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| IC-388 - As a Rostering User, I want the system to notify me when deadline crew duties are expired or close to the expiration date |
| The system shows expired duties assigned to crew members.    It also shows duties with close deadlines (timeline settled by the supervisor) |

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| IC-499 - As a Crew Manager User, I want the system to notify me of crew deadlines |
| The system shows alerts related to t expiration date of crew documents, licences, and medical examination deadlines |

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| IC-517 - As a Rostering User, I want the system to notify me of data inconsistencies between official parameters and those used in the current scenario |
| The system identifies the difference between official and current data related to:   * + Regulation parameters   + Contract parameters   + Margin parameters   + Airport parameters   + Aircraft parameters   + Crew activity parameters   These inconsistencies can be due to parameter updates by supervisors |

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| IC-598 - As a Rostering User, I want the system to notify me of shifts composed of at least 10 days of consecutive duties |
| A shift composed by n or more days without rest days in the home base is defined as mission (with n defined by the supervisor).    For example, a training course of two weeks can be labelled as a mission if the crew members do not go back to the home base during the weekend    The user can manually assign a specific label to these shifts |

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| IC-630 - [NEW-STORY] As a Rostering User, I want the system to notify me of threshold exceeding of proceeding crew assigned to a specific flight |
| The system identifies the amount of proceeding crew assigned to a specific flight.  If this value exceeds the threshold, it sends an alert |

## DDL - Crew Deadlines

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| IC-408 - As a Rostering User, I want the system to notify me when crew document deadlines are approaching |
| The system shows alerts related to crew document deadlines.    Example of crew documents:     * + Passport     - Schengen, passports should have at least 3 months of validity     - non-Schengen, passports should have at least six months of validity when traveling internationally   + Type Training   + Cabin Crew Attestation (CCA)   + EASA Licence     The Crew Manager User role includes:     * + Crew Planning User role   + Crew Tracking User role     The Rostering User receives alerts related to activities with long term deadlines. For instance, the system notifies the Crew Planning User that the passport expiration date of a given captain is at the end of the next quarter. |

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| IC-409 - As a Rostering User, I want the system to notify me when crew instructor and examination licence deadlines are approaching |
| The system shows alerts related to crew instructor and examination licence deadlines.    Example of licences:     * + Type Rating Instructor (TRI)   + Type Rating Examiner (TRE)   + Crew Resource Management (CRM)   + Dangerous Goods Regulations (DGR)   + Cabin Emergency Evacuation Trainers (CEET) |

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| IC-410 - As a Rostering User, I want the system to keep track of the status of instructor and examination licences of crew members |
| The system checks the steps to revalidate instructor and examination licence performed (and not) by the crewman  For instance, for revalidation of a TRI (A) certificate, the applicant shall, within the last 12 months preceding the expiry date of the certificate, fulfil one of the following three requirements:   * + Conduct one of the following parts of a complete type rating training course:     - Simulator session of at least 3 hours, comprising a minimum of 2 take-offs and landings     - one air exercise of at least 1 hour, comprising a minimum of 2 take-offs and landings;   + Receive instructor refresher training as a TRI at an ATO;   + Pass the assessment of competence in accordance with FCL.935. |

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| IC-411 - As a Rostering User, I want the system to notify me when cockpit and cabin crew qualification deadlines are approaching |
| The system shows alerts related to qualification deadlines which are mandatory to crew members.    Example of cabin crew qualifications:     * + Recurrent training ground   + Dangerous Good Refresher   + Touch drills     Example of cockpit crew qualifications:     * + TPC simulator   + OPC simulator   + Type Training   + Dangerous Good Refresher |

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| IC-415 - As a Rostering User, I want the system to notify me when crew medical examination deadlines are approaching |
| The system shows alerts related to periodic crew medical examination deadlines which are mandatory to work as pilot/flight attendant.    Example of medical examination:     * + periodic   + supplementary   + alcohol test |

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| IC-420 - As a Rostering User, I want the system to notify me when the crew cosmic radiation medical examination deadlines are approaching |
| The system shows alerts related to cosmic radiation medical examination deadlines which are mandatory to work as pilot/flight attendant.    Example of medical examination:     * + periodic   + supplementary |

## TPT - Interaction with third-party tools

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| IC-460 - As an ICARO.XT User, I want the system to receive bidding requests and sick notes |
| The system receives crew information from a third-party tool called AirTrack |

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| IC-461 - As an ICARO.XT User, I want the system to share the planned aircraft activities with third-party systems |
| The system shares planned aircraft activity information like flight, crew and meal details, with third-party systems (e.g. AirTrack) |

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| IC-462 - As an ICARO.XT User, I want the system to share with the crew the planned solution (scheduling and rostering) so that crew members can swap pairings between them (Trip Trade functionality) |
| The system shares the planned solution in order to help and support the swap of pairings between crew members |

## MON - Money Machine

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| IC-500 - As a Rostering User, I want the system to estimate the economic cost (€) of a planning scenario |
| The system can calculate the economic cost of a given planning scenario. |

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| IC-501 - As a Rostering User, I want to manage the economic cost parameters |
| The user can modify the parameters necessary to the system for the economic evaluation a planning scenario. |

## ICC - Integration with ICARO

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| IC-614 - As Rostering User, I want to export the roster solutions in an ACM (ICARO) suitable format |
| ACR.XT component can export roster solutions in a format compatible with ICARO |

# Third year - ACM.XT

## USR - User Preference Configuration

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| IC-340 - As an ICARO.XT User, I want to personalize the GUI based on my preferences |
| The user can set preferences like:   * + theme (normal and night mode)   + font size (small, medium, large)   + filters over flight, pairing, and crew overviews |

## CDR - Regulation Configuration

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| IC-559 - As an ICARO.XT Admin, I want to manage multiple regulations |
| The user can update and delete regulations  The creation of a new regulation may require additional tasks for MAIOR |

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| IC-469 - As a Tracking Supervisor, I want to update tracking regulation parameters |
| The user can modify the parameters of  Cockpit and Cabin regulations related to crew and aircraft tracking activities.  Cockpit and Cabin regulation are similar, but they may differ for few parameters.  The user can define a waiver for each rule with a deadline (i.e. it is valid for n days, weeks, months or seasons). The waiver can disable the rule or set new thresholds.  The user can copy and compare the parameters from these regulations.  Example of regulation EASA 83/2014 parameters:   * + max flight duty period   + Minimum rest period away from main base   + Limitation 10h duty with night duties (FRM not implemented) |

## CDR - Contract Configuration

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| IC-560 - As an ICARO.XT Admin, I want to manage multiple contracts |
| The user can create, modify and delete crew contracts if they belong to an existing regulation |

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| IC-471 - As a Tracking Supervisor, I want to manage tracking contract parameters |
| The user can modify the parameters of  Cockpit and Cabin contracts related to crew and aircraft tracking activities.  Cockpit and Cabin contracts are similar, but they may differ for few parameters.  The user can define a waiver for each rule with a deadline (i.e it is valid for n days, weeks, months or seasons). The waiver can disable the rule or set new thresholds.  The user can copy and compare the parameters from these contracts. |

## CDR - Company Restriction Configuration

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| IC-561 - As an ICARO.XT Admin, I want to manage multiple company restriction sets |
| The user can create, modify and delete company restrictions if they are associated with an existing contract (company) |

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| IC-473 - As a Tracking Supervisor, I want to manage tracking company restriction parameters |
| The user can create, modify and delete company restriction related to the tracking phase.  The system offers a list of company restriction constraint types which are customisable by the user |

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| IC-474 - As an ICARO.XT user, I want to manage company restriction parameters in hypothetical scenarios |
| The user can create, modify and delete company restrictions in a hypothetical scenario |

## CDR - Margin Configuration

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| IC-609 - As a Tracking Supervisor, I want to manage tracking margin parameters |
| The user can add, modify, and delete margins related to:   * + regulations   + contracts   + crew activities   The margin has to be tighter than the related constraint.  The margin is a property of the parameter. The user may not set the margins for all the parameters.  The margins are related to a specific regulation, contract, company restriction parameter |

## CDR - Airport Configuration

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| IC-239 - As MCC Supervisor, I want to manage airport parameters related to maintenance activities |
| MCC user can access the information of a given airport, but it can manage (CRUD) only the part related to aircraft maintenance activities |

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| IC-306 - As Flight Tracking Supervisor, I want to manage airport parameters related to aircraft tracking activities |
| The user can add, modify and delete airport details useful for tracking tasks.    For instance:     * + ground handlers   + flight ops   + catering   + safety and Emergency Response   + airport coordination: level 1,2 or 3     The Flight Tracking Supervisor can create an airport with default parameter values |

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| IC-396 - As Crew Tracking Supervisor, I want to manage airport parameters related to crew tracking activities |
| The user can add, modify and delete airport information useful for crew tracking tasks.    For instance:     * + briefing and debriefing   + hotels and shuttles   + ground transfer companies   + transfer time between airport with ground transfers |

## CDR - Aircraft Configuration

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| IC-252 - As a MCC Supervisor, I want to manage aircraft parameters related to maintenance activities |
| MCC user can access all the information related to a specific aircraft, but it can create, modify, delete (CRUD) only the part related to aircraft maintenance. |

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| IC-307 - As Flight Tracking Supervisor, I want to add, modify and delete aircraft parameters related to tracking operations |
| Flight tracking user can access all the information related to a specific aircraft, but it can manage (CRUD) only the part related to flight tracking operations. |

## CDR - Crew Configuration

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| IC-392 - As a Crew Supervisor, I want to manage crew members and their parameters |
| The user can add, modify and delete crew members and update their parameters.  Each crew member is associated with:   * + a regulation   + a contract (with a start and an end date)   + a company restriction set |

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| IC-423 - As an ICARO.XT user, I want the system to update the status of crew members when they become ineligible (or partially ineligible) to flight |
| For instance, crew members become ineligible for their assigned roster activities when:     * + they have an Operational multi-crew limitation (OML) limitation   + they call sick   + their medical and cosmic radiation examinations are expired     - medical examinations expire in a specific day after n years after the last check     - radiation examinations expire in the calendar year   + their flight licences are expired   + their flight qualifications are expired |

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| IC-617 - As an ICARO.XT User, I want the system to update the status of crew member training |
| The system checks the activities performed by crew member and update their status |

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| IC-621 - [NEW-STORY] As an ICARO.XT User, I want to contact crew members |
| The user can call or send an email to a crew member via ICARO.XT |

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| IC-639 - [NEW-STORY] As an Operational Support User, I want to update medical examination and licence deadlines |
| The system offers an intuitive interface to update the deadlines of medical examinations and licences |

## SCH - Algorithm

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| IC-565 - As a Scheduling User, I want the system to handle multi-contract constraints during pairing creation |
| The system is able to create sets of pairings respecting the constraints of different contracts (including company restrictions and margins) |

## MAI - Maintenance Configuration

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| IC-248 - As an MCC User, I want maintenance activity types to be accessible |
| A maintenance activity types is characterized by a set of attributes:     * + name   + frequency   + deadline   + duration   + airports |

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| IC-247 - As an MCC Supervisor, I want to manage maintenance activity types |
| The Supervisor user can create, modify, and delete maintenance activities.  List of maintenance activity types:   * + line check   + weekly   + monthly   + TPC (Tyre pressure check)   + ECM (Engine condition Monitoring)   + mQAr (mini Quick Access Recorder)   + FHDB (Fault History Data Base)   + Work Orders from SAP |

## MAI - Maintenance Management

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| IC-235 - As an MCC User, I want aircraft activities to be visible |
| The system shows rotation information like:     * + aircraft IDs   + aircraft name   + aircraft type     It also shows aircraft activities and their details.    For instance, the system could show the following activities:     * + Official Flights (coming from LH)     - aircraft (rotation) IDs     - ID     - departure and arrival time     - departure and arrival airports   + Maintenance activities     - aircraft IDs     - maintenance activity IDs     - start and end times     - airports |

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| IC-287 - As an MCC User, I want to modify the level of detail in the flight overview |
| The software offers different zoom level over the flight overview: from hours to multiple days |

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| IC-450 - As an MCC User, I want to apply filters to aircraft activities |
| The user can filter official flights, maintenance activities and other usages based on his/her needs.    The system allows to extract the filtered aircraft activities in a suitable data format. |

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| IC-263 - As an MCC User, I want to manage maintenance activities |
| The user can add, modify, updated and delete aircraft maintenance activities created by the user or the algorithm.    The user can set a given maintenance activity as mandatory (immutable).    It shows also SAP work orders. These maintenance activities are immutable (for ICARO.XT) but the system offers a web link to SAP tool.    Alt Text |

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| IC-236 - As an MCC User, I want to move a maintenance activity along a given rotation and between rotations |
| The user can move up or postpone a maintenance activity and move it across aircraft. |

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| IC-242 - As an MCC User, I want to automatically import SAP planned maintenance activities |
| Specific maintenance activity types are planned in SAP.    For example:     * + maintenance A before n take-offs or landings |

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| IC-279 - As an MCC User, I want to automatically receive the outcome of performed maintenance activities |
| The ETLB (Electronic Technical Log Book) contains all the outcomes of performed maintenance activities that will be imported in SAP.    The implementation of ETLB is the in Air Dolomiti road map of 2019. |

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| IC-281 - As an MCC User, I want to receive aircraft restrictions due to MEL |
| The system receives MEL limitations from a third-party system (e.g. Air Dolomiti uses SAP to manage these information) |

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| IC-377 - As an MCC User, I want the system to export a maintenance planning solution in an ACS compatible format |

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| IC-582 - As an MCC User, I want the system to summarize the current filtered aircraft activities |
| The system can produce summaries related to aircraft activities based on the filters applied to the aircraft activity overview |

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| IC-579 - As a MCC User, I want to manage remarks to rotations and flight activities |
| The user can add a (plain text) note to rotations and maintenance activities and share them with other users |

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| IC-611 - As an MCC User, I want to manage aircraft on-ground activities |
| The user can add, modify, updated and delete aircraft on-ground activities |

## MAI - Algorithm

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| IC-376 - As an MCC User, I want the system to propose a valid planning solution of aircraft rotations with maintenance activities |
| The rotation builder algorithm proposes a valid maintenance planning solution considering maintenance activities, KPIs, rotation continuity, airport and aircraft limitations.  The user can set the temporal interval for the maintenance distribution. |

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| IC-552 - As an MCC User, I want the system to propose a valid tracking solution of maintenance activities over an existing planning solution |
| The user can run the rotation builder algorithm over a published planning solution in order to adjust rotations and maintenance activities |

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| IC-532 - As an MCC Supervisor, I want to modify the weight parameters of the rotation builder |
| The user can modify the weights using an intuitive interface.  For instance, the rotation builder weights can be associated with:   * + airports   + maintenance companies   + maintenance activity grouping |

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| IC-266 - As an MCC User, I want to manage the KPIs which group the weights taken into consideration by the rotation builder algorithm |
| The user can tune the algorithm based on business-oriented criteria.  A KPI is a combination of weights.  The system offers an intuitive interface to modify the weights  The user can prioritize and weight KPIs to obtain a maintenance solution more suitable for his/her needs. |

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| IC-556 - As an MCC User, I want to lock assigned aircraft activities so that the rotation builder does not take them into account for maintenance planning solutions |
| The proposed maintenance solutions do not include locked aircraft activities |

## MAI - Maintenance Validation

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| IC-245 - As an MCC User, I want the system to mark maintenance activities violating maintenance type parameters as INVALID |
| The system labels a maintenance activity assigned to a specific aircraft violating non-derogable regulation or contract rules as INVALID.    Violation reasons are shown (and explained) in a human readable manner. |

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| IC-284 - As an MCC user, I want the system to mark maintenance activities which are planned in the critical time period (24 hours before the deadline) as PENDING |
| The system labels a maintenance activity assigned to a specific aircraft in a critical time period as PENDING.  A PENDING maintenance activity can be approved by the supervisor.  Violation reasons are shown (and explained) in a human readable manner |

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| IC-285 - As an MCC User, I want the system to mark maintenance activities violating margins as TIGHT |
| A solution with margin violations can be published.    Violation reasons are shown (and explained) in a human readable manner. |

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| IC-286 - As an MCC User, I want to access to a maintenance solution validation report |
| The user can understand the reason of invalid, pending and tight violations |

## MAI - Scenarios

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| IC-271 - As an MCC User, I want to manage production and hypothetical maintenance scenarios |
| The users can create, modify, and delete a production and hypothetical tracking scenario.    They can also create a new scenario starting from an existing one    An optional step for the creation of a tracking scenario is the selection of a reason code over a set of elements. The users can change the reason code within the publication step.    The user can create a production rostering scenario only on the basis of official flights (SSIM flight).    In this type of scenarios, the maintenance parameters can be modified only by the supervisor    The user can create a hypothetical maintenance scenario on the basis of a set of flights (official or nonofficial)    The user can create, modify and delete maintenance activity, airport, aircraft, regulation, contract parameters |

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| IC-275 - As an MCC User, I want to modify regulation, contract, airport, and maintenance parameters activities in hypothetical rostering scenarios |
| The user can change all the parameters in hypothetical scenarios |

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| IC-277 - As an MCC User, I want to access to an evaluation report of the maintenance solution |
| The report shows a qualitative and quantitative summary of the proposed solution.  For example, the report can contain:   * + total amount of concatenated maintenance activities   + total amount of (temporal) critical maintenance activities   + total amount of maintenance activities performed by EN   Overview examples:   * + Line check and TPC   Alt Text   * + Weekly, ECM and mQAr   Alt Text |

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| IC-278 - As an MCC User, I want to publish as official a promote a maintenance scenario |
| The system promotes a scenario as official maintenance solution only if it is a production scenario (official parameters) and passes the validation step |

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| IC-290 - As an MCC User, I want the system to send the list of maintenance activities assigned to each maintenance company |
| The system creates and sends the list of maintenance activities assigned to the maintenance companies via emails x hours in advance.    Air Dolomiti sends these emails the day before the activities    Example of this type of emails:    Alt Text |

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| IC-515 - As an MCC User, I want to compare scenarios |
| The system shows a set of information useful to compare two or more scenarios |

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| IC-509 - As an MCC User, I want other users to approve a given scenario |
| A scenario may include changes that are related to other user roles.  Before the publication, an MCC user can ask an evaluation to other users/groups/departments. |

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| IC-512 - As an MCC User, I want to manage data inconsistency between official and current data |
| The user can update current data with the official one and the system re-validates the solution |

## TRA - Flight Management

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| IC-295 - As a Tracking User, I want aircraft activities to be visible |
| The system shows rotation information like:     * + aircraft IDs   + aircraft name   + aircraft type     It also shows aircraft activities and their details.    For instance, the system could show the following activities:     * + Flights     - aircraft (rotation) IDs     - ID     - departure and arrival time     - departure and arrival airports     - weather conditions     - forecast     - catering   + Maintenance activities     - aircraft IDs     - maintenance activity IDs     - start and end times     - airports   + On-ground activities     - aircraft IDs     - On-ground activity IDs     - start and end times     - airports     It shows also planned flights changes. |

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| IC-464 - As an ICARO.XT read-only user, I want aircraft activities to be visible |
| The system shows flight details like, aircraft (rotation) IDs, departure and arrival time, departure and arrival airports, weather conditions, forecast, and catering  The ICARO.XT read-only role is created to offer an access to the system for other departments |

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| IC-303 - As a Flight Tracking User, I want to manage aircraft activities and rotations |
| The users can easily create, modify, assign, and delete aircraft activities like flights (including the definition of the priority), maintenance (only within 72H) and on-ground activities.  They can also create, read, update and delete rotations. |

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| IC-311 - As a Tracking User, I want flight activity details to be accessible |
| The system shows different details based on aircraft activity types.    For instance, the details for a flight can be:     * + ATFM restriction   + Crew composition   + Catering   + Notes   + Priority   + total amount of sold tickets   + total amount of boarded passengers (LDM messages) |

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| IC-400 - As a Tracking User, I want to modify the level of detail in the flight overview |
| The software may offer different zoom over the flight overview: from hours to multiple days |

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| IC-304 - As a Tracking User, I want to apply filters to aircraft activities |
| The user can filter official flights, maintenance activities and other usages based on his/her needs.    The system allows to extract the filtered aircraft activities in a suitable data format.    The applicable filters can include:     * + critical flights   + flights with incomplete crew   + cancelled and delayed flights   + flight activities |

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| IC-347 - As a Flight Tracking User, I want to manage remarks to rotations and flight activities |
| The user can add a (plain text) note to rotations and flight activities and share them with other users |

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| IC-345 - As a Tracking User, I want to manage flights with no standard crew |
| A flight can require more crew members. For instance, a long-haul flight might require an additional pilot.    A flight can operate with 2 cabin crew members our of 3 with limitation of the maximum number of passengers allowed. |

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| IC-297 - As a Tracking User, I want to manage critical flights |
| A flight is labelled as critical if it satisfies at least one of the following conditions:     * + it is part of an irregular A/C rotation   + it has not airport slot   + it is late (estimated or “effective”)   + it has been cancelled   + it has been rescheduled     The system shows in a different way the cancelled or delayed activities like flights, maintenance and training |

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| IC-305 - As a Flight Tracking user, I want to assign an aircraft activity to a specific aircraft |
| The user can easily assign an aircraft activity like flights, maintenance and training to a specific aircraft |

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| IC-313 - As a Tracking User, I want the system to manage messages (e.g. Telex) regarding flight data |
| The system can send and receive all the necessary aircraft information from/to third-party entities (e.g. Eurocontrol).    The user can filter and look for sent telex messages |

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| IC-463 - As a Fight Tracking User, I want weather conditions and forecast to be easily accessible |
| The system shows weather conditions (METAR) and forecast (TAF) for a specific location |

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| IC-326 - As a Flight Tracking User, I want to monitor the flights and their paths |
| The user can monitor the flights using data coming from multiple sources, like ADSB, Eurocontrol (ATC) and ACARS.    ADSB are Information sent from the aircraft via radio. This information is used by FlightRadar to monitory aircrafts’ movements. |

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| IC-403 - As a Flight Tracking User, I want the system to summarize the current filtered aircraft activities |
| The system can produce summaries related to aircraft activities based on the filters applied to the aircraft activity overview |

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| IC-468 - As a Flight Tracking User, I want to communicate to third-party tools the cancellation of a flight |
| The system sends to Phil.Net the details of a cancelled flight |

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| IC-596 - As a Crew Tracking User, I want the system to request the printing of deadheads and proceeding to flights tickets |
| The user can decide which booked deadheads and proceeding flights tickets the system has to request to print |

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| IC-600 - As a Tracking User, I want to identify convertible base pairings |
| A convertible base pairing is pairing for which exists at least another home base that can replace the original one satisfying planning and tracking constraints and maintaining the same number of shift days.    The user can change the home base for these pairings.    The system shows this type of pairing in a different way. |

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| IC-640 - [NEW-STORY] As a Flight Tracking User, I want to access historical data of the performed aircraft activities |
| The system can show relevant information related to aircraft activities performed in the past.  For instance, given a flight number and a day, the system shows:   * + flight details   + the aircraft assigned to that flight and its rotation   + crew details   + events that have affected it |

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| IC-647 - [NEW-STORY] As a Tracking User, I want the system to mark maintenance activities which are planned in the critical time period (24 hours before the deadline) as PENDING |
| The system labels a maintenance activity assigned to a specific aircraft in a critical time period as PENDING.  A PENDING maintenance activity can be approved by the supervisor.  Violation reasons are shown (and explained) in a human readable manner |

## TRA - Crew management

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| IC-382 - As a Crew Tracking User, I want to manage crew activities |
| The user can create, modify, assign and delete crew activities.  The system stores the planning solution for each crew member and their actual crew activities. |

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| IC-361 - As a Crew Tracking User, I want planned crew activities to be visible |
| The system shows the activities assigned to each crewman |

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| IC-372 - As a Crew Tracking User, I want to manage unassigned and partially assigned pairings |
| A pairing without a crew is labelled as unassigned. While a pairing with an incomplete crew is labelled as partially assigned.  The crew composition is a feature of the aircraft type. For instance, the standard flight crew for an Embraer 195 is a captain, a pilot and 3 cabin assistants. A pairing containing Embraer 195 flights which is assigned to a crew composed of a captain, 3 cabin assistants but not the pilot, is labelled as partially assigned.  The system shows unassigned and partially assigned pairings and offers the functionalities to assign crew member to pairings |

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| IC-370 - As a Crew Tracking User, I want INVALID and PENDING assigned rostering activities to be visible |
| Non-compliant rostering activities are shown in the roster overview |

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| IC-371 - As a Crew Tracking User, I want to apply filter to crew activities and members |
| The users can filter crew activities based on several activity parameters like date, time, and minimum rest.    They can also filter crew member based on crew attributes like name, ICARO id, roles, and base airport |

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| IC-362 - As Crew Tracking User, I want manage deadheads and proceeding to flights |
| The users can look for and book deadheads and proceeding to flights.  They can also modify pre-booked and booked tickets (change name, cancellation, etc.), and request the issue of booked tickets.  The system automatically checks and modifies the booked tickets when users modify assigned crew activities. For instance, a swap of crew members between pairings, the assignment of a stand by member to a pairing. It uses third-party services (e.g. Amedeus Altea, Lufthansa open API) to request information of (and to book) other company flights. |

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| IC-366 - As Crew Tracking User, I want to manage accommodation and shuttle services |
| The user can create, look for, modify, and delete accommodations and shuttle service bookings. |

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| IC-367 - As Crew Tracking User, I want manage ground transfers between airports based on the planning solution |
| The user can create, look for, modify, and delete ground transfers. |

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| IC-369 - As a Crew Tracking User, I want INVALID and PENDING pairings to be visible |
| Non-compliant pairings are shown in the pairing overview |

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| IC-379 - As a Crew Tracking User, I want the system to notify me of predictions of irregular roster activities |
| The system is able to predict irregular roster activities based on planning solution, disruptions, and notification coming from third-party companies (e.g. Eurocontrol).    For instance, Eurocontrol sends to ICARO.XT flight delay estimations which may create violations in one or more crew pairings. |

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| IC-381 - As a Crew Tracking User, I want the history of roster activity changes to be accessible |
| The system can show the planned roster activities of a given crew member and all the alteration performed by tracking users on it |

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| IC-393 - As a Crew Tracking User, I want the system to summarize the current filtered rostering activities |
| The system can produce summaries related to roster activities.  For instance, a summary can include:   * + Training   + Illness   + Invalid and pending roster activities |

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| IC-402 - As a Crew Tracking User, I want to modify the level of detail in the roster activity overview |
| The software may offer different zoom over the crew activities overview: from hours to multiple days |

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| IC-404 - As a Crew Tracking User, I want the system to manage when FDP (Flight Duty Period) exceeds the threshold |
| The system shows the FDP threshold violations which must be accepted by the captain of the violating flights.    In case of violation approval, the captain has to send a report to the company. |

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| IC-405 - As a Crew Tracking User, I want the system to manage flights with passengers' limitation due to reduced cabin crews |
| If the cabin crew misses a member, the flight can be carry out with a limitation in the number of passengers.  Flights departing from home bases cannot be limited due to reduced cabin crews |

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| IC-406 - As a Crew Tracking User, I want the system to manage crew member sick leaves and their authorization workflows |
| The system can manage sick leaves and their extensions including sick leaves not in-home base and shift interruptions during working day |

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| IC-533 - As a Crew Tracking User, I want to manage ineligible (or partially ineligible) to flight crew members |
| The system shows all the roster activities (pairing included) affected by ineligible to flight crew members.  Crew members become ineligible for their assigned roster activities when:   * + they have an Operational multi-crew limitation (OML) limitation   + they call sick   + their medical and cosmic radiation examinations are expired   + their flight licences are expired   + their flight qualifications are expired   An ineligible to flight crew member cannot be associated with crew activities related to flights |

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| IC-536 - As a Crew Tracking User, I want to manage crew member incompatibilities |
| The system helps the user to avoid the creation of pairing containing incompatibilities between crew members like:   * + enemy crews   + IML limitations   + junior captain with junior pilot   + over 60 captain with over 60 pilot |

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| IC-541 - As a Crew Tracking User, I want to manage crew member missions |
| A shift composed by n or more days without rest days in the home base is defined as mission (with n defined by the supervisor).    For example, a training course of two weeks can be labelled as a mission if the crew members do not go back to the home base during the weekend    The user can manually assign a specific label to these shifts |

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| IC-548 - As a Crew Tracking User, I want to manage remarks to crew members |
| The user can add a (plain text) note to a crew member and share it with other users |

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| IC-567 - As a Crew Tracking User, I want to manage crew members with different contracts |
| The system can manage crew members characterized by different contracts (multi-contract feature). |

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| IC-595 - As a Crew Tracking User, I want to manage crew holidays |
| The users can create, modify, delete crew holidays and leaves if the Fleet Manager (pilots) and Chief Cabin Attendant (Flight attendants) authorizes the crew member requests |

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| IC-605 - As a Crew Tracking User, I want to manage crew rests |
| The user can create, modify and delete rest days.  The system helps the user to monitor taken, untaken and taken in advance rest days |

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| IC-612 - As a Crew Tracking User, I want to manager crew meals |
| The user can create, modify, and delete meals associated to crew members.    The system receives crew meal preferences coming from third-party tools. |

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| IC-616 - As a Tracking User, I want to communicate with the cockpit crew during a flight |
| The system allows to the users to communicate with the cockpit during the flights using ACARS messages.    A prerequisite to accomplish this feature is the definition and the maintenance of a communication channel between tracking office and aircraft. If prerequisite is not satisfied, M.A.I.O.R will not implement this feature. |

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| IC-634 - [NEW-STORY] As a Crew Tracking User, I want the system to notify to crew members of changes of their planned activities |
| The system notifies to crew members the changes of their planned activities decided by Tracking Users.  It sends this information via email or via other communication channels and tracks the delivery status (e.g. received, notified, read) |

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| IC-641 - [NEW-STORY] As a Crew Tracking User, I want to access historical data of the performed crew activities |
| The system can show relevant information related to crew activities performed in the past.  For instance, given a crew member id and time period, the system shows a summary of the activities performed by the crew member in that period like holidays, rest days, stand-by duties. |

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| IC-642 - [NEW-STORY] As a Crew Tracking User, I want to perform operations on pairings related to crew members |
| The user can operate on the relationship between pairings and crew members.  For instance, the user can modify the crew composition of a specific pairing:   * + add extra crew members (e.g. pilots, instructors and examiners)   + add supernumerary employees (e.g. technicians and not on duty crew members) |

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| IC-643 - [NEW-STORY] As a Crew Tracking User, I want to send a message to a subgroup of crew members |
| The system allows to dispatch a customizable messages to a crew member subgroup.  For instance, the user may send a message to a crew of a specific pairing or to all the crew members landing a specific airport in a given day |

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| IC-644 - [NEW-STORY] As a Tracking User, I want the system to mark pairings and assigned crew activities violating non-derogable rules as PENDING |
| The system labels as INVALID a pairing or a roster activity assigned to a given crew member violating non-derogable regulation or contract rules.  Violation reasons are shown (and explained) in a human readable manner. |

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| IC-645 - [NEW-STORY] As a Tracking User, I want the system to mark pairings and assigned crew activities violating derogable rules as PENDING |
| The system labels as PENDING a pairing or a roster activity assigned to a given crew member violating derogable regulation or contract rules.  Violation reasons are shown (and explained) in a human readable manner. |

## TRA - Frozen Event Management

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| IC-302 - As a Tracking User, I want the system to freeze a flight immediately after the landing phase |
| A landed flight can be modified only by a supervisor user |

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| IC-344 - As a Flight Tracking Supervisor, I want to modify frozen flight details |
| The user can modify frozen flight details. In this case, the system does not send telex messages to airports and third-party authorities |

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| IC-341 - As a Crew Tracking User, I want the system to freeze a given period of crew activities when they have been sent to the salary tool |
| The users cannot modify crew activities that have been already sent to ENDOV |

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| IC-343 - As a Crew Tracking Supervisor, I want to modify frozen crew activities |
| Only A user with supervisor privileges can modify frozen crew activities |

## TRA - Flight plan manager

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| IC-327 - As a Flight Tracking User, I want operational flight plans to be accessible |
| The system shows operational flight plans.    It may show also other information like diversion airports and planned flight plans. |

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| IC-328 - As a Flight Tracking User, I want to create, modify and delete operational flight plans |
| An operational flight plan includes the following information:   * + departure and arrival airports   + departure and arrival time   + aircraft details   + other   It may include:   * + forecast (METAR and TAF)   + Notam   + Briefing details   + other |

## TRA - Scenarios

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| IC-332 - As a Tracking User, I want to manage production and hypothetical tracking scenarios |
| The users can create, modify, and delete a production and hypothetical tracking scenario.    They can create a new scenario starting from an existing one    A mandatory step for the creation of a tracking scenario is the selection of a reason code over a set of elements. The user can change the reason code within the publication step. |

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| IC-335 - As a Tracking User, I want to modify regulation, contract, crew and roster activities in hypothetical tracking scenarios |
| The user can modify regulation/contract/airport/airplane parameters/crew parameters, but he/she cannot publish (i.e. merge with the existing situation) the solution. |

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| IC-337 - As a Tracking User, I want to access to an evaluation report of a given scenario |
| The report shows a qualitative and quantitative summary of the proposed solution.  For instance, the report can include:   * + single crew member details     - total amount of working days/hours     - total amount of leaves and holidays     - estimation of overtime hours   + overall crew information:     - distribution across the crew of working hours     - distribution across the crew of stand-by duties     - distribution across the crew of holidays   + flight information     - total amount of cancelled, delayed, diverted flights     - total amount deadhead and proceeding to flights     - total amount of road transfers |

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| IC-338 - As a Tracking User, I want to publish in the existing situation the production tracking scenario |
| The system publishes a scenario as official tracking solution only if it is a production scenario (official parameters) and passes the validation step. |

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| IC-349 - As a Tracking User, I want other users to approve a given scenario |
| A scenario may include changes that are related to other user roles.  It also includes the suggestions coming from the real-time optimizer.  Before the publication, a tracking user can ask an evaluation to other users/groups/departments. |

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| IC-514 - As a Tracking User, I want to manage data inconsistency between official and current data |
| The user can update current data with the official one and the system re-validates the solution |

## TRA - Trip Trade

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| IC-458 - As a Crew Tracking User, I want the system to manage pairing swaps between crew members |
| A crew member can swap a pairing with a colleague if it does not create an invalid or pending roster activity.  The system helps and guides crew members during this process showing a list of compatible pairings for the selected one |

## TRA - Real-time Optimizer

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| IC-427 - As a Tracking User, I want the system to suggest a solution to mitigate existing issues |
| The system suggests a solution in order to mitigate issues and reduce risks of the current situation taking into account flights and crew activities.    The real-time optimizer helps the users to manage disruptions like:     * + Strike   + Aircraft On Ground   + Crew events:     - unexpected sick calls     - delays   + Flight events:     - Cancellations     - Delays     - Diversions     The goal of the optimizer is the minimization of a cost function which maps an event (or values of one or more variables) onto a real number intuitively representing some "cost" associated with the event.    For instance, the optimizer could propose a solution which minimizes:     * + flights to cancel (or flight to delay/reassign)   + ferry flights to create   + aircraft activity schedule   + crew roster     A solution proposed by the optimizer can include:     * + creation, cancellation and reschedule of flights   + activation of stand-by duties   + changes in assigned crew activities (pairings, on ground duties, …)   + changes in assigned aircraft activities (maintenance activities, on-ground duties, …) |

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| IC-528 - As a Tracking User, I want the system to show the changes of flight and crew activities proposed by the optimizer |
| The system shows the solution proposed by the real time optimizer in a suitable way with the goal of comparing it with the existing situation. |

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| IC-432 - As a Tracking User, I want to manage the KPIs which group the weights taken into consideration by the real-time |
| The user can tune the algorithm based on business-oriented criteria.  A KPI is a combination of weights.  The users can change the relevance of KPI in order to obtain a solution more suitable for their needs. |

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| IC-430 - As a Tracking Supervisor, I want to modify the weight parameters of the real-time optimizer |
| The user can modify the weights using an intuitive interface.  Each action proposed by the optimizer is associated with a cost (based on a set of weights). For instance, the proposed mitigation solution is composed of the following actions:   * + flight creation   + flight cancellation, the cost is related with the number and the type (economy, business, deadhead, proceeding to flight) of booked passengers   + flight rescheduling   + activation of standbys   + changes in assigned crew activities |

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| IC-429 - As a Tracking User, I want to evaluate a disruption mitigation solution |
| The system provides a report of the proposed solution.    A report shows the information related to the flights, crew and maintenance activity changes respect to actual situation.    For example, a report can show:     * + flights info     - cancelled flights     - delayed flights     - reassigned flights (ACMIO, Aircraft Crew Maintenance Insurance Overhead)     - ferry flights     - aircraft activities (maintenance, on ground training, …)   + crew info     - aircraft changes     - accommodations and hotel shuttles     - ground transfer shuttles     - deadhead and proceeding to flights     - stand-by duties |

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| IC-527 - As a Tracking User, I want to set as immovable flights, pairings and crew members |
| The algorithm cannot modify flights, pairings and other assigned crew activities labelled as immovable by the user |

## OPM - Operation Management

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| IC-387 - As a Tracking User, I want to store the steps that I performed to solve a specific issue |
| The system requires to users the selection of a reason code when they start to solve an issue.  The reason code can be changed during the process of issue solving |

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| IC-495 - As an ICARO.XT user, I want flights, aircraft, and crew member history to be accessible |
| The system stores the data regarding planned and performed flights, aircraft and crew activities. |

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| IC-522 - As an ICARO.XT User, I want the system to compare aircraft and crew activities performed in a given time period with the planned solution |
| The system shows a set of useful information to compare aircraft and crew activities performed in a given time period with the planned solution including deadhead and proceeding to flights, road transfers and accommodations |

## ALR - Alert Manager

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| IC-317 - As a Scheduling User, I want the system to notify me of INVALID, PENDING, and TIGHT pairings |
| Non-compliant pairings are shown in the alert manager overview |

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| IC-323 - As a Flight Tracking User, I want the system to notify me of critical flights |
| A flight is labelled as critical if it satisfies at least one of the following conditions:   * + it is part of an irregular A/C rotation   + it has not a slot   + it is late (estimated or “effective”)   + it has been cancelled   + it has been rescheduled |

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| IC-384 - As Crew Tracking User, I want the system to notify me of INVALID, PENDING, and TIGHT estimated roster activities |
| Non-compliant roster activities are shown in the alert manager overview |

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| IC-385 - As a Crew Tracking User, I want the system to notify me of unassigned or partially assigned pairings |
| The alert manager shows the pairings not assigned or partially assigned (3 out of 5) to crew member. |

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| IC-325 - As a Tracking User, I want the system to manage multiple information sources (also for the same event) |
| The system can manage data coming from multiple information sources |

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| IC-389 - As a Crew Tracking User, I want the system to notify me of planned and not executed crew no-flight activities |
| The system shows planned and not performed crew duties like training or simulation activities. |

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| IC-422 - As a Crew Tracking User, I want the system to notify me when crew members become ineligible for their assigned roster activities |
| For instance, crew members become ineligible to perform assigned roster activities if:   * + they have OML limitations   + they are over 60 years old (it depends on the crew composition)   + they call sick   + their medical and cosmic radiation examinations are expired   + their flight licences are expired   + their flight qualifications are expired |

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| IC-504 - As an ICARO.XT User, I want the system to notify me of airport events |
| The system analyses and shows airport events coming from several sources that are useful for the users.  For instance, Eurocontrol publishes traffic congestion information, while airports can share temporary disruptions through NOTAM messages. |

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| IC-511 - As a Flight Tracking User, I want the system to notify me of critical weather conditions and forecasts |
| The system shows alerts related to weather warning and forecast (METAR and TAF) which may create disruptions |

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| IC-519 - As an MCC User, I want the system to notify me of inconsistencies between official parameters and those used in the current scenario |
| The system identifies the difference between official and current data related to:   * + Flights   + Aircraft activities   + Regulation parameters   + Contract parameters   + Margin parameters   + Airport parameters   + Aircraft parameters   + Aircraft activity parameters   These inconsistencies can be due to parameter updates by supervisors |

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| IC-518 - As a Tracking User, I want the system to notify me of inconsistencies between official parameters and those used in the current scenario |
| The system identifies the difference between official and current data related to:   * + Regulation parameters   + Contract parameters   + Margin parameters   + Airport parameters   + Aircraft parameters   + Aircraft activity parameters   + Crew activity parameters   These inconsistencies can be due to parameter updates by supervisors |

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| IC-574 - As a Tracking User, I want the system to notify me of inconsistencies between actual data and those used in the current scenario |
| The system identifies the difference between official and current data related to:   * + Flights   + Aircraft activities   + Crew activities |

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| IC-575 - As a Flight Tracking User, I want the system to notify me of flight diversions |
| During a flight, the system can detect if a flight does not respect the flight plan comparing it with the actual position of the aircraft.    This functionality includes:     * + hijackings   + change of arrival airports due to unexpected events (e.g. adverse weather conditions)     The system may receive information related to diversion from multiple sources:   * + Eurocontrol   + Aircraft via ACARS messages   + Arrival airports via ASM messages   + Operation Control office of other companies via ASM messages |

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| IC-547 - As a Crew Tracking User, I want the system to notify me no-confirmed pre-booked tickets |
| The system pre-books deadhead and proceeding to flight tickets during the planned solution publication.  While, the tickets are printed x hours before the flights |

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| IC-597 - As a Crew Tracking User, I want the system to notify me of shifts composed of at least 10 days of consecutive duties |
| A shift composed by n or more days without rest days in the home base is defined as mission (with n defined by the supervisor).    For example, a training course of two weeks can be labelled as a mission if the crew members do not go back to the home base during the weekend    The user can manually assign a specific label to these shifts |

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| IC-603 - As a Rostering User, I want the system to notify me of untaken and taken in advance rest days |
| The system identifies untaken rest days during the planning period (rolling).  It also sends an alert if crew members took the minimum amount of rest days defined in the contract for the calendar year.  Otherwise, the company has to pay the missing rest days |

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| IC-604 - As a Crew Tracking User, I want the system to notify me of untaken and taken in advance rest days |
| The system identifies untaken rest days during the planning period (rolling).  It also sends an alert if crew members took the minimum amount of rest days defined in the contract for the calendar year.  Otherwise, the company has to pay the missing rest days |

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| IC-606 - As a Flight Tracking User, I want the system to notify me of inconsistencies between the slot associated to flights and arrival-departure airports |
| The system checks if the slot assigned to the flight is not at the same level of departure and arrival airports standard.  Airport coordination slots:   * + level 1 not coordinated   + level 2 facilitated   + level 3 coordinated |

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| IC-613 - As a Tracking User, I want the system to notify me of inconsistencies between the meals requested by crew members and the meals loaded in the aircraft |
| The system compares the meal requested by crew members with those loaded in the aircraft.  The inconsistencies can be due to pairing and aircraft changes |

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| IC-622 - [NEW-STORY] As a Flight Tracking User, I want the system to notify me when aircraft become ineligible to flight |
| The system shows the details of the aircraft which are not allowed to flight.  It also shows the reason of these situations, like aircraft damage or not executed maintenance activities |

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| IC-623 - [NEW-STORY] As an Flight Tracking User, I want the system to notify me of MEL limitations assigned to aircraft |
| The system shows the details of aircraft with MEL limitations |

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| IC-624 - [NEW-STORY] As an MCC User, I want the system to notify me when aircraft become ineligible to flight |
| The system shows the details of the aircraft which are not allowed to flight.  It also shows the reason of these situations, like aircraft damage or not executed maintenance activities |

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| IC-625 - [NEW-STORY] As an MCC User, I want the system to notify me of MEL limitations assigned to aircraft |
| The system shows the details of aircraft with MEL limitations |

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| IC-629 - [NEW-STORY] As a Tracking User, I want the system to notify me of new destinations |
| The system identifies new destination respect to the previous three months |

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| IC-631 - [NEW-STORY] As a MCC User, I want the system to notify me of rotation continuity inconsistencies |
| A rotation must satisfy the continuity of operations: the departure airport of a given flight is equal to the arrival airport of the previous flight; moreover, its departure time is later than the arrival time of the previous flight.  It includes also the night stop: the arrival airport of the last flight of a given day must be equal of the departure airport of the first flight of the next day |

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| IC-633 - [NEW-STORY] As a Flight Tracking User, I want the system to notify me of rotation continuity inconsistencies |
| A rotation must satisfy the continuity of operations: the departure airport of a given flight is equal to the arrival airport of the previous flight; moreover, its departure time is later than the arrival time of the previous flight.  It includes also the night stop: the arrival airport of the last flight of a given day must be equal of the departure airport of the first flight of the next day |

## DDL - Crew Deadlines

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| IC-585 - As a Crew Tracking User, I want the system to notify me when crew document deadlines are approaching |
| The system shows alerts related to crew document deadlines.    Example of crew documents:     * + Passport     - it should have at least six months of validity   + Type Training   + Cabin Crew Attestation (CCA)   + EASA Licence     The Crew Manager User role includes:     * + Crew Planning User role   + Crew Tracking User role     The Crew Tracking User receives alerts related to crew activity deadline in next x hours. |

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| IC-586 - As a Crew Tracking User, I want the system to notify me when crew instructor and examination licence deadlines are approaching |

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| IC-587 - As a Crew Tracking User, I want the system to keep track of the status of instructor and examination licences of crew members |
| The system checks the steps to revalidate instructor and examination licence performed (and not) by the crewman  For instance, for revalidation of a TRI (A) certificate, the applicant shall, within the last 12 months preceding the expiry date of the certificate, fulfil one of the following three requirements:   * + Conduct one of the following parts of a complete type rating training course:     - Simulator session of at least 3 hours, comprising a minimum of 2 take-offs and landings     - one air exercise of at least 1 hour, comprising a minimum of 2 take-offs and landings;   + Receive instructor refresher training as a TRI at an ATO;   + Pass the assessment of competence in accordance with FCL.935. |

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| IC-588 - As a Crew Tracking User, I want the system to notify me when cockpit and cabin crew qualification deadlines are approaching |
| The system shows alerts related to qualification deadlines which are mandatory to crew members.    Example of cabin crew qualifications:     * + Recurrent training ground   + Dangerous Good Refresher   + Touch drills     Example of cockpit crew qualifications:     * + TPC simulator   + OPC simulator   + Type Training   + Dangerous Good Refresher |

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| IC-589 - As a Crew Tracking User, I want the system to notify me when crew medical examination deadlines are approaching |
| The system shows alerts related to periodic crew medical examination deadlines which are mandatory to work as pilot/flight attendant.    Example of medical examination:     * + periodic   + additional   + alcohol test |

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| IC-591 - As a Crew Tracking User, I want the system to notify me when the crew cosmic radiation medical examination deadlines are approaching |
| The system shows alerts related to cosmic radiation medical examination deadlines which are mandatory to work as pilot/flight attendant.    Example of medical examination:     * + periodic   + supplementary |

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| IC-419 - As a Crew Tracking User, I want the system to notify me when a given crew member needs a cosmic radiation additional examination |
| The system notifies when a crewman needs a supplementary cosmic radiation examination. |

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| IC-592 - As Rostering User, I want the system to notify me when a given crew member needs a cosmic radiation additional examination |
| The system notifies when a crew member needs a supplementary cosmic radiation examination. |

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| IC-417 - As a Crew Tracking User, I want the system to notify me when a given crew member needs additional medical examinations |
| The system notifies when a crewman needs a supplementary medical examination.  A supplementary medical examination can be request in the following cases:   * + Failure of a previous medical examination   + after a surgery   + after a consecutive period of illness greater than 21 days   + other |

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| IC-593 - As a Rostering User, I want the system to notify me when a given crew member needs additional medical examinations |
| The system notifies when a crewman needs a supplementary medical examination.  A supplementary medical examination can be request in the following cases:   * + Failure of a previous medical examination   + after a surgery   + after a consecutive period of illness greater than 21 days   + other |

## TPT - Interaction with third-party tools

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| IC-466 - As an ICARO.XT User, I want to share with Business Intelligence (BI) third-party tools the information needed for dashboards and reports |
| The system offers SQL views to Business Intelligence third-party tools |

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| IC-467 - As an ICARO.XT User, I want to share performed and cancelled flight information with third party software |
| The system shares with third-party tools (e.g. Monalisa) the details of performed and cancelled flights. |

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| IC-521 - As an ICARO.XT User, I want to share flight and airport information with third-party tools |
| The system shares:     * + performed aircraft activity information like flight, crew, and weather details   + airport information like slot and notams     with third-party systems (e.g. FlightTrack) |

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| IC-557 - As a Rostering User, I want to manage hotel bookings (with HAP) |
| HAP will be updated based on Air Dolomiti requests:   * + crew members should stay in the same hotel if they have the same shift the next day   + Show booking history: cancellation, waiting for confirmation, etc.   + Improvement of the workflow of booking changes   + Improvement of hotel room availability |

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| IC-563 - As a Crew Tracking User, I want to manage hotel bookings (with HAP) |
| HAP will be updated based on Air Dolomiti requests:   * + crew members should stay in the same hotel if they have the same shift the next day   + Show booking history: cancellation, waiting for confirmation, etc.   + Improvement of the workflow of booking changes   + Improvement of hotel room availability |

## MON - Money Machine

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| IC-502 - As a Tracking User, I want the system to estimate the economic cost (€) of a tracking scenario |
| The system can calculate the economic cost of a given planning scenario. |

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| IC-503 - As a Tracking User, I want to manage the economic cost parameters |
| The user can modify the parameters necessary to the system for the economic  evaluation a tracking scenario. |

## GDPR - General Data Protection Regulation

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| IC-544 - As an ICARO.XT User, I want the system to manage sensitive and personal crew data |
| Personal data means any information relating to an identified or identifiable natural person. While, Sensitive data includes racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade union membership, genetic data, biometric data, data concerning health or data concerning a natural person's sex life or sexual orientation.  The system manages crew sensitive data like:   * + name, surname, date of birth, …   + licences and qualifications   + deadlines (medical examinations and documents)   + health status   The system may log also the change of sensitive data in order to recreate past crew member status. A crew member could have been changed the surname or the fiscal code.  The system hides the reason of crew flight ineligibility if it is defined as sensitive (e.g. health limitations). It shows a general label like “ineligible to flight”. |

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| IC-545 - As an ICARO.XT User, I want the system to archive crew sensitive data |
| The system segregates and stores crew sensitive data.  ICARO.XT defines a strictly access policy to prevent sensitive data misuses. However, this information are available as aggregated data for reporting purpose |

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| IC-546 - As an ICARO.XT User, I want the system to extract all the data related to specific users if they request it |
| Actual or former crew members can require sensitive information including performed shifts |

## MUA - Multi airlines

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| IC-568 - As Rostering User, I want to manage in & out body leases |
| The system offers a set of functionalities to manage IN & OUT body lease:   * + import (IN) and export (OUT) of crew member data like personal data, licences, deadlines and cosmic radiation taken   + export (IN) and import (OUT) of planned and performed crew activities like flights and training activities   The user role associated with these functionalities may change during the development |

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| IC-569 - As a Crew Tracking User, I want to manage in & out body leases |
| The system offers a set of functionalities to manage IN & OUT body lease:     * + import (IN) and export (OUT) of crew member data like personal data, licences, deadlines and cosmic radiation taken   + export (IN) and import (OUT) of planned and performed crew activities like flights and training activities     The user role associated with these functionalities may change during the development |

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| IC-570 - As a Multi-Airline Planning User, I want to manage in & out aircraft leases |
| The system offers a set of functionalities to manage IN & OUT aircraft lease:     * + import (IN) and export (OUT) of aircraft data like vehicle inspection status, maintenance deadlines and MEL   + export (IN) and import (OUT) of planned and performed aircraft activities like flights and maintenance activities     The user role associated with these functionalities may change during the development |

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| IC-571 - As a Flight Tracking User, I want to manage in & out aircraft leases |
| The system offers a set of functionalities to manage IN & OUT aircraft lease:     * + import (IN) and export (OUT) of aircraft data like vehicle inspection status, maintenance deadlines and MEL   + export (IN) and import (OUT) of planned and performed aircraft activities like flights and maintenance activities     The user role associated with these functionalities may change during the development |

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| IC-572 - As a Multi-Airline Planning User, I want to manage flight exchanges |
| The system offers a set of functionalities to manage flight exchanges:     * + overview of the flight network of the other companies   + transfer of a flight to other companies   + receiving of flight from other companies   + swap of flight between companies     The system may define specific workflow of these functions    The user role associated with these functionalities may change during the development |

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| IC-573 - As a Flight Tracking User, I want to manage flight exchanges |
| The system offers a set of functionalities to manage flight exchanges:     * + overview of the flight network of the other companies   + transfer of a flight to other companies   + receiving of flight from other companies   + swap of flight between companies     The system may define specific workflow of these functions    The user role associated with these functionalities may change during the development |

# To be decided

# To be assigned