**Technical specification for**

**Net Briefing System**

**For HungaroControl – Hungarian Air Navigation Services**

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# General requirements

## General System description

### The System **shall** provide web based internet FPL and briefing services. The briefing service **shall** contain the NOTAM and MET briefing services.

### The System **shall** be compatible (interoperable) with the EAD data structure (data upload and download).

### The service **shall** be implemented in accordance with the SWIM principles. (System Wide Information Management).

## In this document the following definitions are used:

**Customer**  HungaroControl – HungaroControl Hungarian Air Navigation Services.

**Tenderer** Manufacturer, who submits the competition (potential supplier)

**Supplier** Winner of the tender

**“shall”**  indicates a requirement which must be fulfilled

**“not allowed”** indicates prohibited function

 **“Will”** indicates Customer’s activity

**“System”** the System provided by the Supplier,which fulfills below listed requirements

## General tender requirements

### The structure of the offer **shall** follows the structure of this technical specification.

### Tenderer **shall** declare the fulfillment of all the requirements in a compliance matrix.

### Tenderer **shall** provide a detailed System plan, with logical- and process relationships.

### During tests, Customer reserves the right to request about to change the layout, appearance, or logical operation of the System.

# User requirements

## Flight plan handling requirements

### The System **shall** ensure the following services:

* + - Flight Plan submitting and the handling of the related messages;
		- NOTAM briefing;
		- Meteo Briefing;
		- display the AUP, the unique active and the daily planned airspaces;
		- display the parameters of aerodromes, airspaces and navigational equipment;
		- define and publish unique airspaces.

### The System **shall** support Flight Plan submitting and the handling of the related messages.

### The System **shall** comply with the ICAO Doc 4444 and the EUROCONTROL (IFPS) requirements.

### The System **shall** provide an ICAO Doc 4444 Appendix 2 based, fillable FPL form.

### The System **shall** reject those FPL-s, which are not compliant with the ICAO Doc 4444 Appendix 2 requirements.

### The pre-defined, fixed fields of the FPL **shall** be selected from a list (e.g. Turb. cat: L/M/H/J).

### The System **shall** be able to create and forward the CHG / DLA / CNL messages via AFTN to the ARO for a prepared FPL.

### The System **shall** be able to create and forward the ARR / DEP messages via AFTN.

### If a FPL field is syntactically and / or logically incorrect at FPL saving or submitting, the System **shall** automatically jump into the first incorrect field, and **shall** mark all the incorrect fields.

### The System **shall** display the actual message which will be sent via AFTN before submitting it to the ARO (e.g. FPL-, DEP-, etc.).

### FPL fields are **not allowed** to accept commas and special characters (see: INO DU operation).

### The fields **shall** accept only alphanumeric characters (ABC123…).

### During FPL filling the date and time selection **shall** be selectable from a pop-up calendar (e.g. DOF), and the System **shall** paste the selected date and time to the (18) field in a syntactically correct form.

### In the FPL list view the System **shall** automatically refresh the status of the FPL, when the ARO processed it (e.g. accept / reject).

### An email message **shall** be sent to the user about the acceptance/rejection of the FPL.

### In the FPL overview list the System **shall** provide the following functions to reuse a FPL:

* + - Open;
		- Reuse;
		- Return Flight;
		- Change;
		- Delay;
		- Cancel.

### In field (15), the System **shall** offer the place names as route points from a pre-defined list defined by HungaroControl.

### The pre-defined list **shall** be connected with HungaroControl’s pre-defined place list.

### The System **shall** be able to convert all place names into 11 character versions during FPL filling. The System **shall** recognize and convert the place names with and without accents (e.g. Almásfüzitő into ALMASFUZITO, Balatonakarattya into BALATONAKAR, difference from ICAO doc 4444).

### In field (18), the System **shall** automatically place the registered phone number in numeric, editable format, after the RMK/ characters.

### In a CHG message the System **shall** check if the new EOBT time is later than the previous EOBT value.

### The System is **not allowed** to accept an earlier time than the EOBT. In this case the System **shall** warn the user to delete the FPL, and submit a new one with the earlier EOBT.

### The System **shall** support the user to set the EOBT both in local time and in UTC time.

### The System **shall** warn the user if field (19) is filled incorrectly. In field (19), the followings **shall** be filled mandatory:

* + - endurance;
		- persons on board;
		- aircraft color and markings;
		- pilot in command.

### The System **shall** be able to export the following in pdf document:

* + - FPL;
		- Flight route with the selected base layer;
		- PIB;
		- Pilot log;
		- MET;
		- Weight and balance sheet.

### The System **shall** accept maximum 7 alphanumeric characters as aircraft identification number.

### The System **shall** check if field (8) is filled with Y or Z character, than field (15) **shall be** filled with status IFR or VFR.

### In field (9) the Number of aircraft value **shall** be 1 by default.

### In field (9) the Type of aircraft field’s value **shall** be checked, if the type is in the ICAO Doc 8643. If this field is filled with ZZZZ, the System **shall** check field (18) if aircraft type is given after the TYP/ characters.

### The definition of the take-off weight **shall** be written next to the H / M / L values in field (9).

### If in (13) and (16) fields ZZZZ was given in the DEP, DEST or ALTN fields, than in field (18) the place name **shall** be displayed with its 11 character names from the pre-defined place name list with its respective coordinates, following with a space character, preceded by the DEP/, DEST/ or ALTN/ characters.

### In field (13) and (16) the System **shall** accept only the 4 letter ICAO code of the aerodromes in the DEP, DEST or ALTN fields.

### In field (15) the System **shall** check if the cruising speed and cruising level fields are filled.

### In field (15) the System **shall** accept 7 and 11 character coordinates (e.g. 46N019E, or 4620N01921E), and the direction and distance of a navigation equipment (e.g. DUB180040).

### During PIB generation, the System **shall** generate the NOTAM list from the EAD database.

### The AIP documents **shall** be updated according to HungaroControl’s publication automatically.

### FPL, METAR and other messages **shall** be sent via AFTN.

## Displaying requirements

### The System **shall** be able to display the airspaces what will be activated in the future with a “time slider”. HungaroControl will provide the real time airspace data.

### The route display, -creation and –modification functions **shall** be enabled on the map as well.

### A warning **shall** be displayed in case of planning a flight into a restricted area.

### All warnings **shall** be displayed in a pop-up window.

### The System **shall** display the different information on different layers:

* + - base layer – official;
		- static airspace layer: AIP – official;
		- active airspace layer: FUA – official;
		- navigation layer – official;
		- drone layer – non official;
		- user layer – non official;
		- MET layer – non official.

### The base layer **shall** contain the following information:

* + - geographical borders;
		- google satellite view;
		- vector view;
		- terrain.

### The static airspace layer **shall** contain the following information:

* + - every static airspace presented in the AIP.

### The active airspace layer **shall** contain the following information:

* + - planned airspaces for today’s date;
		- airspaces activated by the AMC.

### The navigation layer **shall** contain the following information:

* + - aerodromes with the related published data;
		- navigation equipment with the related AIP data;
		- navigation points with the related AIP data.

### The drone layer **shall** contain the following information:

* + - user defined airspaces.

### The user layer **shall** contain the following information:

* + - user defined airspaces.

### The MET layer **shall** contain the following information:

* + - MET telegraph with its location;
		- meteorological radar picture.

### The System **shall** be able to display the Hungarian airspace structure on a separated layer.

### The System **shall** be able to display the Hungarian active airspace structure on a separated layer.

### The layers **shall be** classified in two categories: Display data deriving from Official and Non-Official sources. (E.g. Official AUP data is published by Customer, Non-Official data is provided by the airspace users)

### The layers **shall** be displayed together or separately.

### The System **shall** store the airspace, flight plan data for at least 60 days and these data can be handled only by the System Administrator.

### The System **shall** produce event logs continuously.

### Searching in these event logs **shall** be connected to user rights.

### The System **shall** crosscheck the requested airspace with the actual airspace situation:

* + - If there is no active airspace managed by the AMC, the System **shall** indicate that the airspace can be requested;
		- If there is an active airspace managed by the AMC, the System **shall** indicate the remaining time of the reserved air space;
		- If there is an active airspace managed by the AMC, the System **shall** indicate it in red, and the airspace should not be reserved until it becomes free;
		- If there is a reserved, active airspace in the System already, it **shall** be indicated in yellow;
		- If there is a requested airspace, which will be activated in the future, this information **shall** be provided to the users.

### The System **shall** send email messages to the users about the notifications of the requested airspace.

### Message templates **shall** be provided for sending out the notification.

### The message templates **shall** be editable by the administrator privilege user**s**.

## Requirements for operating the base layer:

### The base layer **shall** provide the following options:

* + - geographical boundaries;
		- google satellite view;
		- vector view;
		- terrain.

## Requirement for operating the "static airspace structure layer":

### The System **shall** update the static air traffic information (AIP) AIRAC cycle automatically.

### Airspace information **shall** come from official sources, e.g. EAD, SDO/SDD, AeroDB (HungaroControl Local DB)

## Requirement for operating the "active airspace structure layer”:

### The System **shall** display permanent and temporary airspaces managed by the AMC and their activation/deactivation in real time.

### The System **shall** be able to display the AUP and the activation of the airspaces in real time (TRA, Temporary Areas, etc.).

### The System **shall** be able to display the airspaces in real time, which are activated / deactivated in the LARA software handled by the AMC.

### The activated airspaces **shall** be visible in the layers listed below in real time:

* + - Drop zones;
		- Temporary Airspaces;
		- Drone Airspaces;
		- TRA-s;
		- Danger;
		- Traffic Information Zones;
		- Military CTR-s;
		- Military TMA-s.

## Requirements for operating the „navigation layer”:

### The following **shall** be visible in the layer:

* + - airports and it published data;
		- ICAO Area 1. obstacles;
		- VOR;
		- DME;
		- NDB;
		- Waypoints.

### The System **shall** automatically update the static air traffic information (AIP) at every AIRAC cycle.

### Airspace information **shall** come from official sources, e.g. EAD, SDO/SDD, AeroDB (HungaroControl Local DB).

## Requirements for operating the „Drone layer” – Drone Zone:

### The System **shall be** able to draw airspaces for drone flying.

### Users are **not allowed** to draw more than one airspace at the same time.

### The drawn airspace for drone flying **shall** be cylindrical, its radius and height **shall** be given in meters.

### The System **shall** be able todisplay the airspace’s vertical extent given in meters also in feet according to the ICAO Conversion Table.

### The System administrator **shall** be able to set the default and the extreme values of the drawn airspace for drone flying (radius, height, time interval).

### The height of the drawn airspace for drone flying **shall** be given in AGL (Above Ground Level).

### The administrator **shall** be able to set the operating time interval of the drawn airspace for drone flying.

### The user **shall** be able to define the start and end date / time of the drawn airspace for drone flying.

### The user **shall** be able to close the drawn airspace for drone flying before the end date / time.

### The System **shall** be able to export the actual airspace situation related to the drawn airspace for drone flying in pdf document in printable format.

### If a drawn airspace for drone flying is accepted by the System with its parameters, the System **shall** display it on the drone layer.

### The System **shall** accept the requested drawn airspace for drone flying only if the requested start time is set after the current time. It is not allowed to set the start time prior the current time.

## Requirements for operating the “Drone Layer” – No drone zone:

### The System **shall** provide the possibility for the authorized user to create a „No drone zone” on the drone layer by “freehand” drawing. (Polygon, cylinder, air corridor (horizontal and vertical extent))

### The so-drawn airspace **shall** be received "no drone zone" label automatically.

### The authorized user **shall** be able to define the start and end date / time of the “No drone zone”, even for the future.

### The System **shall** accept the requested “No drone zone” only if the requested start time is set after the current time. It is **not allowed** to set the start time prior the current time.

### If an airspace is activated by the AMC, or a "no drone zone" is defined, which overlaps with the drawn airspace for drone flying, a warning **shall** be displayed to the User that the flight **shall** be suspended.

## Requirements for operating the „User Layer”:

### The System **shall** be able to edit, display the user-defined airspaces.

### The System should **not allow** the user to draw more than one airspace at a time.

### The users **shall** be able to define airspaces in the System (polygon, circle-based airspace) for information.

### The System **shall** be able todisplay the airspace’s vertical extent given in meters also in feet according to the ICAO Conversion Table.

### The user **shall** be able to define the start and end date / time of the user airspace.

### The user **shall** be able to close the user airspace before the end date / time.

### The System **shall** accept the requested user airspace only if the requested start time is set after the current time. It is **not allowed** to set the start time prior the current time.

### The System **shall** be able to export the actual airspace situation related to the user airspace in pdf document in printable format.

##  Requirements for operating the „MET Layer”:

### The MET layer **shall** display an automatically updated weather radar map with the following information:

* + - rain;
		- cloud;
		- wind.

### The MET layer **shall** display METAR and TAF data with its location.

##  Requirements related to meteorological messages

### Connection **shall** be established to receive METAR and TAF messages from the SADIS server.

### The System **shall** be able to display meteorological radar images (e.g. movement of thunderstorms) on the map used for flight planning on a separate meteorological layer. Physical interface will be provided by HungaroControl, logical interface **shall** be established by the Supplier.

### The Code Name (METAR / SPECI / TREND) **shall** be displayed at the beginning of METAR messages.

### The type of the notice **shall** be present in a given „TAM” message (e.g. NOTAM / SNOWTAM / ASHTAM).

# Technical requirements

## Environment

### The System **shall** run in the following browsers (optimized for both desktop and mobile devices):

* + - Internet Explorer;
		- Mozilla Firefox;
		- Google Chrome;
		- Apple Safari.

### The System **shall** support the following operating systems:

* + - Android;
		- iOS;
		- Windows.

### Problems related to displaying issues upon browsers or operating System updates **shall** be addressed by the Supplier.

## Security

### The System **shall** provide a self-registration form for the new users.

### The registration form **shall** have the following fields:

* + - e-mail address (mandatory)
		- password (mandatory)
		- surname
		- last name
		- address
		- phone number
		- usage type (checkbox): VFR, IFR, DRONE (RPAS)
		- license number, and/or identifier(s) received after registering personal drone(s)
		- captcha code to prevent robots from automated registering

### Users **shall** be able to change their profile data.

### During password change the new password **not allowed** to be sent out to the user in any form.

### Web services implemented in the System **shall** be protected against OWASP TOP10 vulnerabilities:

* + - A1 Injection;
		- A2 Broken Authentication and Session Management (XSS);
		- A3 Cross Site Scripting (XSS);
		- A4 Insecure Direct Object References;
		- A5 Security Misconfiguration;
		- A6 Sensitive Data Exposure;
		- A7 Missing Function Level Access Control;
		- A8 Cross Site Request Forgery (CSRF);
		- A9 Using Components with Known Vulnerabilities;
		- A10 Unvalidated Redirects and Forwards.

### During the implementation of the application secure coding **shall** be applied. (secure coding - OWASP Secure Coding Practices Reference Guide - <https://www.owasp.org/images/0/08/OWASP_SCP_Quick_Reference_Guide_v2.pdf>).

### Passwords stored in the database **shall** be encrypted in accordance with industry best practices (e.g. sha256/512, bcrypt, scrypt)

### In case of System controlled user inputs there **shall** be a respective server-side check as well (validating only on the client side is not sufficient) and the used methods **shall** be unified throughout the system.

### During login to the System in case of failed user name/password the System is **not allowed** to indicate which one was entered incorrectly.

### In case of web use, sending authentication data **shall** use only HTTP POST queries, sending data in the URL (HTTP GET queries) is **not allowed** to be used.

### Functions requiring successful authentication and their parameters **shall** be accessible through HTTP POST queries.

### In every function requiring authentication (as well where there is no visible function for the user) it **shall** be checked whether the request was initiated by a properly authenticated user.

### If the System uses encryption, it **shall** be implemented in accordance with industry best practices and the process **shall** be defined (ie. handling encryption keys).

### A list of the applied dependencies used and their sources (frameworks, programming languages, third party codes and applications) **shall** be made.

### The error handling of the System **shall** be implemented to let only authorized personnel access sensitive information.

### Communication between the components of the System **shall** use encrypted channels (where feasible), e.g. HTTPS between the website’s server and client side.

### Components of the System **shall** be well separated (Database – application – presentation) and only the necessary functions **shall** be accessible from the components.

### The System users’ (e.g. database access for the application) access data (username / password), and other sensitive information **shall** be stored securely (it must not be stored without encryption in a configuration file), other users, applications **shall** not have access.

### The System **shall** have a full-featured logging mechanism.

### The audit type events and administrative actions **shall** be logged in the system.

### The solution **shall** have a multiple level, role-based authentication system.

### It **shall** be ensured that a given user has privileges only for the necessary tasks in his/her day-to-day work.

### There **shall** be three System environments (development, test, live).

### The test environment **shall** be able to process the same functionalities in the same way as in the live environment.

### The System **shall** display error messages with the reason of the error in case of there are failures during use

### Error events **shall** be logged in a structured format. Logging depth **shall** be parameterized.

### Activities carried out during the use of the System **shall** be logged at the transaction level. (At a minimum, it must be logged who and when created / modified a given record the last time. Certain tables, eg. changing authorization, parameters, it might be needed to store the historical data of the given record.)

### The System **shall** provide high availability and be error prone. (Redundant and cluster solutions) This requirement only applicable for the productive environment.

### The System **shall** provide 98% availability.

### The System **shall** be enabled to use the Hungarian character set (during data entry and display)

### The service provider **shall** have a development System at their premises.

### Updates and/or patches **shall** be presented to HungaroControl in releases, to which there **shall** be descriptions and release notes attached along with the installation documents.

### If needed, the supplier **shall** provide on-site and phone support for the installations.

## Interfaces

### The System **shall** be able to work together with the following systems:

* + - AFTN/AMHS;
		- HAWK;
		- BF box;
		- EAD;
		- NM B2B;
		- SADIS;
		- LARA.

## Network

### The supplier **shall** provide the necessary network requirements at the latest when the „System design ready” milestone has been reached to let the Customer have time to prepare the network.

### Customer **shall** approve the previously agreed System design, including the network related suggestions.

### Customer **shall** be able to modify the IP addresses of the NetBriefing system.

### The documentation **shall** contain the information related to IP changing covering all units.

### At a minimum, the following standards **shall** be complied with (telecommunication):

* + - RFC 793 Transmission Control Protocol (TCP);
		- RFC 791 (IPv4);
		- RFC 768 User Datagram Protocol (UDP);
		- RFC 2236 IGMP V2;
		- ISO/IEC 8877 (RJ45);
		- IEEE 802 (Medium Access Control – MAC);
		- ISO/IEC 8802-3 (Ethernet);
		- ISO/IEC 8802-3u (Fast Ethernet);
		- IEEE 802.3ab (Gigabit Ethernet – 1000 Base-T);
		- RFC 792 (ICMP).

### The System **shall** provide a one-way transfer of data between the System’s „internal” and „external” environment, from inside to outward initiated from the inside (push type), encrypted data transmission in case of radar data.

### The minimum and optimum infrastructural requirements related to the recommended work environment **shall** be defined by the Supplier (recommended server-side processor number, speed, memory, storage, etc.)

### The network infrastructure required by the system’s internal infrastructure will be provided by HungaroControl, including cabling, network devices and configuration.

### The whole System **shall** use IPv4 network protocol stack for communication.

### The network segment isolated for the system’s internal infrastructure will be provided by HungaroControl. Isolation will be done at Layer 3 level. Connecting to other systems and to the internet is only possible if the types and parameters of the connections are accurately documented.

## Mobile device-optimized requirements

### If there is a GPS coordinate available for use by the mobile device, the System **shall** use that information as the center for drawing a drone airspace (displaying on map).

### The System **shall** provide a way to select the center of a drone airspace while drawing it on a map.

# Training

### Training **shall** be provided for the technical staff before the Site Acceptance Test (SAT) at the installation site.

### Training **shall** be provided for the maintenance staff and for the users separately.

### Training for the maintenance staff **shall** be held in 4 groups, 4 people per group.

### Training for the users **shall** be held in 2 groups, 6 people per group.

### The training **shall** be held in Hungarian or in English

### Training for the maintenance staff **shall** cover the operating of the equipment, changing of main parts, maintenance, error handling and error prevention.

### Training for the users **shall** cover the system’s operative use.

# Schedule

### The Supplier **shall** create a schedule, which contains the main activities, timings and main milestones.

### The schedule **shall** contains at least the following milestones:

* + - Finished System design;
		- SAT – Site Acceptance Test;
		- Handover for operation.

# Quality assurance

### The Supplier **shall** maintain an efficient quality assurance System to ensure the quality of the product.

### The Supplier **shall** provide test equipment.

### The supplier **shall** execute all investigations and verifications in accordance with the contract to ensure that the product meets the requirements of this specification.

### The Supplier **shall** provide a 500 engineering man working hour per year for support.

# Documentation

## General

### The documentation **shall** be provided in English and/or Hungarian language with charts and diagrams.

### Symbols and terms **shall** be used consistently throughout the whole documentation.

### In case of commercially available hardware and software components, the documentations **shall** be enclosed.

### The documentation **shall** be provided in three (3) copies.

### Except the commercially available products documentation, all of the documentation shall be provided in electronic format.

## Technical and functional specification documents

### The Supplier **shall** deliver the user guides and diagrams in three hard (3) copies for the Net Briefing System.

### The documentation **shall** contain every user and technical aspects of the Netbriefing including:

* + - installation;
		- user guide;
		- technical and maintenance guides;
		- all other necessary documents.