

Dear Sirs

With great pleasure, we received the information of being pre-qualified and invited to submit an indicative tender in the selection process for the PRG Airport Passenger Terminal – Design Study. We can confirm to perfectly understand the assignment on the whole and to be 100% committed to render all our experience and expertise for the benefit of this challenging and very interesting project in PRG.

This proposal offers PRG Airport a compelling team:

- Planeground as the airport consultant behind the winning concepts of the most recent and prestigious Terminal expansion projects in EU: AMS Terminal A (2017); MUC-Terminal 1 Expansion (2016).
- One of the most wanted Czech newcomer architects of the year 2017. International prize-winning architecture and urban design firm: Chybik+Kristof.
- Techniserv, the well established and experienced technical engineering company at PRG Airport with 25+ years of in-depth knowledge of the existing facilities.

This team provides an ideal blend of international and local expertise, aiming at highest quality within the most cost-effective and convenient frame for the benefit of PRG Airport.

1. ANALYSIS OF PROJECT ASSIGNMENT

1.1 Appreciation and basic principles of the project

(related to ANNEX F to TD: i. – description / clarification confirming basic project principles)

The Prague airport expansion programme constitutes a project of great national significance. The capacity development of the main international gateway to the Czech Republic intends to strengthen the position of PRG within the international air traffic networks with the aim to propel economic growth by an improved international connectivity of the city and the region.

PRG expansion programme - Market and Strategy

Traffic numbers at PRG impressively recuperated in the past 2-3 years, after a period of stagnation and even decline in Passenger numbers between 2009-2014. The current annual growth rates of 8-16%, which are induced by Low-Cost Carriers (LCC) as well as evolving intercontinental flights (e.g. Emirates) spark the plans to considerably enhance the infrastructure capacity. However, such a pace of growth might not be sustainable and should not blindly be projected to forthcoming years: a) because of the volatile market, especially at airports with a high LCC penetration rate – here, exceptional growth periods are often followed by a consolidation phase b) because of the projected expansion plans at the 3 major airports in the 300km vicinity of PRG.

- BER: new airport to be operational in 2-3 years; Masterplan 2040 for 55 Mio PAX.
- MUC: Expansion of Terminal 1; Plans for 3rd parallel RWY in 2025.
- VIE: Expansion of Terminals; Plans for 3rd RWY (parallel System) in 2025.

The above facts explain the importance of a duly considered management process in the implementation of the expansion programme. In particular, the capital-intensive terminal complex must be developed in a strictly demand driven and gradual manner.

CAPABILITY CLAIM I – WE UNDERSTAND

PRG airport’s expansion programme is a project of national concern. However, the urgent demand is opposing the high complexity and costs in this project. Its gradual development therefore is a managerial imperative and challenge in one.

- Planeground attaches the highest importance to a phaseable terminal design, that is cost-effective and strategy-conform.

Nevertheless, the new expansion plans of PRG underpin the strategic ambition of the airport (and the country) to take a great leap forward to exploit PRG’s potential as a major international air-transportation node in Eastern Europe.

Next step in history for PRG Airport

The airport has experienced a long and changeful history. Founded in 1937, the airport just last year celebrated its 80th anniversary of existence at the present location. The first terminal was designed by prize-winning architect Adolf Benš and was constructed in the southern part of the airport - nowadays a converted area for general aviation and aircraft maintenance.

In the 1960s at the beginning of the commercial jet-era the new “Terminal North” was developed; a building that -back at the time- again featured high-quality and timeless architecture. This building is the oldest part of the terminal, that is still in use.



Figure 1: PRG Terminal North (1960s)

It took almost 40 years until 1997, a few years after the Czech Republic have constituted, that the Terminal North was subjected to major modification and expansion measures. Only 9 years later, when the Czech Republic entered the EU, a new Terminal 2 was inaugurated adjacent to the existing Terminal 1. This means, the existing Terminal consists of three terminal generations, which continuously are undergoing renovations and upgrades, but in the essence are still operational in their original structures.

The present Passenger Terminal Design Study comprises of yet another expansion for 2025/2040 and forms the next step in PRG terminal development history.

CAPABILITY CLAIM II – EXCELLENT TRACK RECORD (SIMILAR TO PRG)

PRG Terminal consists of an amalgamation of 3 terminal generations from the 60s, 90s and 00s, with an additional expansion of Terminal 2 projected in year 2025.

- ➔ **Planeground are experts in developing historically grown terminal facilities with high complexity and under full operations at e.g. AMS, FRA, CGN and MUC.**

One of the challenges of the present Terminal Design Study will be to cope with the historical dimensions of the project, which means: providing state-of-the-art terminal design that adequately matches with the existing functional, technical and architectural settings.

The PRG terminal design study: Project goals

In 2016 ADPi has finalized an extensive development study on the PRG Airport Masterplan and Terminal Developments. The finalization of the report did not result in immediate decision-making but might have left open some questions and imprecisions. So, prior to the initiation of a comprehensive architectural design development procedure, the project has to be validated and defined in more detail. This present Study intends to on the one hand bridge the gap of missing insights and on the other hand targets to create unanimous consent among PRG decision-makers about the eventual development project to be released.

Thus, the overarching objective is two-fold: a) to clear out any doubts in terms of functionality, technical viability and operational suitability of the concept b) to create a “wow-factor” among the stakeholders in order to create momentum for the definite decision with the subsequent design and realization phase. In a nutshell, the main goals of the design study can be summarized as follows:

1. *Validate and improve the ADPi concept propositions*
The client seeks a profound expert’s second opinion on the ADPi results. This includes the identification of areas and elements that should be subject to further improvement.
2. *Provide answers on most exigent questions (i.e. PRG concerns).*
 - ➔ How to develop security, baggage handling and kerbside? - The decision of rerouting 100% departing PAX through T2 will have a considerable impact on these functions (within the project zone and beyond). The study shall elaborate on and reconfirm the feasibility of the concept.
 - ➔ How to become compatible with existing technical and structural conditions (at interface with existing building)? - The study shall affirm the feasibility and compatibility of the project in the fields of structure, HVAC, M&E, fire protection considering existing situation and local regulations / particularities.
 - ➔ How to optimize the commercial concept without compromising on functionality? - With Non-Aviation revenues being a major source of income – the principles for a modern and successful Retail, F&B and BC Lounge design shall be duly implemented.
 - ➔ How to suitably phase the developments, while remaining fully operational? – The study shall identify phaseable project modules that can be constructed or omitted upon request/demand (or: depending on financial-economic circumstances).

Furthermore, these modules / project-phases shall proof their constructability under full operation of the terminal.

- How much does it cost, and where to leverage economies. – CAPEX and OPEX estimations shall be provided, including an effective “design-to-cost” approach.

3. *Determine functional and architectural concept and design guidelines as basis for subsequent design development phase*

The study shall provide highest quality on both fields a) functional design, meaning: conform to capacity demand, operationally efficient and cost-effective and b) with highest aesthetic and architectural excellence, that matches the aspiration to accentuate the key position of PRG airport. The principle layout concepts shall be developed in adequate detail without anticipating, restricting or confining subsequent design development stages.

CAPABILITY CLAIM III – DECISION SUPPORT IS OUR CORE COMPETENCE

The PRG Terminal Design Study is a pre-design study, based on ADPi propositions and to be elaborated in close cooperation with PRG. The study will result in an unanimously approved and clear concept that will form the basis for subsequent design developments.

- It is planeground’s core competence to provide planning and consultancy services in the decision-making process of a pre-design stage of a terminal development (see 3 Tender References in the Annex).

1.2 Project context and aspects affecting the design

(related to ANNEX F to TD: ii. – evaluation of local conditions and circumstances affecting the design)

The number of conceivable conditions and circumstances that could have an effect on a terminal design are almost innumerable. The following list therefore concentrates on the most likely aspects, that might come into play in the PRG case (please note: an evaluation of the real local conditions and circumstances in PRG would require precognition of the project → so, here is a summary of potential influencing factors with examples illustrating the effect on the design). They can be categorized in 6 main clusters according to the source of influence:

1. *Management strategy*

- Aspiration of PRG Airport
 - A capitol airport that intends to represent the country or region will strive for an iconic design with high service quality and a unique PAX experience. A Low-Cost Airport with a strong focus on profitability might accept a lower service level and put emphasis on functional and less elite design.
 - The strategy of whether or not introducing product differentiation within a terminal is paramount to its design: An exclusively dedicated Pier for a national home carrier (e.g. Lufthansa Pier A in FRA) greatly differs from a Pier specifically designed for low-cost carrier usage (e.g. Easy-Jet Pier in AMS) - in terms of available gate and circulation area, boarding processes, room for retail and other amenities, comfort and quality standards (e.g. climatization, lights etc.); materials and furnishing etc.
- Financial-economic resources

- A cost cap is a determining factor for the terminal design. It provokes a more cost-conscious planning and design process (modularity and conformity of main elements) and can ultimately lead to a “design-to-cost” methodology, (which is, to a great part, a “shrink-to-fit” process). In MUC T1 Expansion project the “design-to-cost” method resulted in considerable squaremeter cuts and a simpler, less-expensive façade and bridge design.
- Weak capital backing can lead to the necessity to provide a “highly phaseable design” which means to introduce measures that enable small-scale sequential expansion steps of the building in line with available funding.
- A project business plan, that shows a high dependency on non-aviation revenues, will put emphasis on maximizing retail and commercial area.
- Home carrier / airline relationship
 - A “system-partnership” often leads to extra design requests by the home-carrier e.g. clear corporate identity, dedicated check-in, exclusive gate-usage, special PAX treatment (e.g. Prio-PAX processing) etc.
 - A network home carrier also requires quick and smooth transfer capabilities in the terminal. This affects numerous aspects of a terminal design like: PAX-Flow configuration and the introduction of a transfer node (incl. security control, border control, customs). In addition, appropriate measures have to be designed to handle the respective transfer baggage. The postulate of a minimum connecting time (e.g. 30 min in MUC) may require additional adaptations to the design (e.g. moving walk-ways, short-cuts etc)
- Procurement processes
 - It makes a difference for the design of a project, if it is being awarded a) in a classical manner to an architect who is solely responsible for its design (strives for optimum aesthetics) b) a design/built contractor (strived for a design with low construction cost) c) a design/built/maintain contractor (strives for a design with optimum life-cycle costs).

2. Traffic and Market Developments.

- Industry Developments
 - The continuously developing Low Cost Carrier business model is transforming the market and will bring further changes to airport design: a) LCCs are increasingly entering the main airports asking for special design (e.g. pre-boarding zone; walk boarding etc.); b) Low Cost Longhaul flights are emerging in CGN (Eurowings) and in CPH/ARL (Norwegian) generating some 20% transfer rate; c) “self-hubbing” Low-Cost bases arise, where passengers self-organize their connection and transference (CGN, BGY, STN partly AMS) – this trend can be facilitated by terminal design features (e.g. bag-drop in reclaim hall etc).
 - Another trend deriving from airlines is the “multiple-hub” strategy of alliance carriers (e.g. Lufthansa group). Dominating carriers have enormous impact and threat potential on terminal developments and design. With PRG being surrounded by LH-Group Hubs (FRA, MUC, BER, VIE) this might lead to the desire to establish a SKY-Team hub in the region with e.g. an exceptional comfort standard as counterbalance.
- Airport competition
 - In regions with strong competition and overlapping catchment areas e.g. DUS, CGN, FRA the terminal processes and design can be a distinct differentiating factor for PAX and airlines alike. CGN for example chose for

the “Low-Cost niche” and designs their terminal expansions accordingly (i.e. walk-boarding with pre-boarding zone; highly commercialized seating and waiting areas; simple and low-invest expansions; partly acceptance of IATA Level D etc.).

→ Air-Traffic Developments

- The rise of intercontinental routes at an airport (with mostly widebody aircraft) is a game changer for the terminal design. This phenomenon often occurs at medium size airports (ca. 10-20 MAP e.g. CGN, HAM, BHX, GVA WSW, PRG etc). Not only does this require wider gates and different bridge design; it also affects peak demand capacity at certain processors; also PAX and BAX-transfer become an issue; sometimes BC-lounges and other amenities for a more demanding clientele are requested.
- The mix of destinations and especially the proportion of Schengen/Non-Schengen/Non-EU routes is vital for the terminal design. This determines the capacity demand of many functions – first and foremost the number of dedicated Schengen / Non-Schengen gates with the respective PAX segregation requirements (e.g. unclean arrivals). But also border control, customs and special screening procedures for US-bound flights are effected. Any shifts in the composition of the destination-mix can severely cause capacity constraints. The introduction of swing-gates is an option to partly mitigate any capacity disbalances.

→ Ground-Traffic Developments

- The modal split of passengers accessing the airport is responsible for design and dimensioning at the terminal landside. Depending on the ratio of public transportation offerings, the kerbside might be designed for dedicated taxi and bus services only or simply provide for a reduced “kiss&fly” zone. Also the number of meeters and greeters can vary which affects the respective area requirements at the well-wishers / welcomers hall. And not to forget the area requirements for car rentals – which can be massive at some destinating airports with limited public transportation.
- A newly planned train station (as envisaged in PRG) can have a big impact on terminal design. Landside PAX-Flows are shifting and new injection points where people enter and exit the terminal are being introduced. Depending on the integral concept of the station and the terminal even check-In kiosks and bag-drop facilities can be reallocated to the station, which reduces facility demand in the terminal.

3. Terminal Operations

→ Decentral vs central security (also transfer)

- Most airports nowadays prefer a central security system due to various reasons: lower personnel cost, centralized staff facilities, open gate area for PAX, no adverse commercial effects. Nevertheless, one single centralized security filter (or transfer node) for all passengers can sometimes be hard to realize, due to flow constraints within the existing structures. Also redundancy might be an argument for a dual security filter concept.

→ Swing-gates

- Very distinct peaks at different times for Schengen and Non-Schengen flights lead to an unfavorable gate demand. The introduction of several swing gates, a “connected swing gate area” or even an entire “swing pier” can alleviate gate capacity constraints and save considerable invest costs.

- Late gate call concept
 - In order to maximize PAX dwell time in the commercial areas of the terminal, a “late gate call” concept can be introduced. This has a consequence on the design of the centralized retail areas (e.g. larger area demand; “wait-while-consume” concept; gathering area in front of info screens etc.) as well as gate configuration (less gate area demand, less retail demand etc.).
- Walk-through vs. boulevard retail concept
 - There are two philosophies with regards to the commercial concept and PAX-Flow configuration in the central terminal area: a) 100% forced walk-through PAX-Flow concept through shop area (e.g. STN; DUS) b) “boulevard shopping concept” with the PAX circulation area as central spine and the shops aside (e.g. MUC, ZRH). The difference lies in either a revenue-focused or a PAX-centric approach for the interior design.
- Common use vs. dedicated use facilities
 - The number of check-in and bag-drop facilities can be considerably reduced, when the terminal operator steers on developing common use instead of dedicated use counters.
- Self service vs. serviced processes
 - Automation and self-service provisions find their way into all areas of terminal processes and affect terminal design: Self-service Check-in & Bag drop systems (more CI-kiosks, partly replacing CI counters); Biometric border control systems e.g. easy pass (require more depth in layout); new upcoming biometric boarding pass control (requires additional space in gate). All of them have in common that the demand for staff room decline.

4. User Requirements.

- Airlines
 - It is obvious that airlines -especially the fixed-base home carrier airlines- have a great stake in terminal design. With their specific processes and demand for quality (or low cost) they often determine to a great extent the basis for design of the facilities to be planned (see also: “1. Management strategy: home carrier / airline relationship”).
- ATC
 - Unobstructed sight-lines from the tower to the airside maneuvering area is often a prerequisite by ATC (sometimes limited use of cameras is permitted). Nevertheless this can influence the building height and shape of a terminal.
 - Obstacle limitation surface (OLS) also can be a limiting factor to the height of a terminal building (especially when close to RWY (as in PRG the case).
 - Sometimes the material and shape of the façade can cause adverse radar reflections, which is unacceptable and will lead to design changes or mitigation measures.
 - Glare of the façade can also cause problems for pilots in the approach phase and should be avoided by design.
- National Security and Border Control Agencies
 - The security requirements imposed by national regulations are varying by country. Area and facility demand for passenger control and baggage control system is nationally regulated but also the regime for landside access (an issue since BRU attacks in 2016).
 - Border police determine the area and facility requirements at emigration and immigration in the terminal. Moreover, the growth of intercontinental traffic

at PRG also augments the area and facility demand for customs (e.g. VAT reimbursement counters), drug control (e.g. sniffing areas at baggage system).

- For US-bound flights the American national homeland security and border control requests specific screening procedures which also can have a great impact on the terminal design e.g. dedicated area for personal data collection, second security process, enclosed departure gate area (depending on applied system and bilateral agreements with US state departments).
- Handling Agents
 - PRM flows are often serviced by handling agents, demanding for specific requirements of the terminal design (ramps, elevators etc).
 - Staff for PAX-handling and aircraft-handling often require certain area and rooms in the terminal for operational or recreational purposes. Their specific requirements have to be considered in the design.
- Concessionaires
 - One of the main stakeholder groups influencing the interior design of the terminal are the concessioners. Shop allocation and design are crucial for their business model and thus have to be duly considered.
 - Additional back-store area or preparation rooms (e.g. kitchens for F&B) might necessitate special design for equipment and technical installation. Depending on the logistic chain concept, goods delivery and waste removal have to be designed as separate flows (with separate security).

5. Extrinsic System Factors

- Technological Progress
 - The general technological progress might not account to a specifically local condition or circumstance affecting the design. However, the willingness (or reluctance) to adapt to new trends or the eagerness to become a front-runner to apply new industry technologies and products can make a difference in terminal design (e.g. seamless travel; one-stop control; augmented reality for signage and way finding etc).
- Political conditions and constellations
 - Changes in EU/Non-EU (East Europe) relationships might have consequences on the air traffic in PRG being “a regional hub to the East”. With Romania, Bulgaria and former Yugoslavian countries, soon joining the EU-Schengen area, this will shift the Schengen/ Non-Schengen ratio at the airport. More importantly: any political climate change between EU and RUS can boost or decline trunk route traffic at PRG.
- Regulatory amendments
 - Any amendments of national regulatory framework with regards to e.g. technical installations, fire protection rules etc. can have an impact on the PRG terminal design, especially in conjunction with Point 6. (see. hereunder)

6. Intrinsic System Factors

- Existing (Terminal) infrastructure e.g. installations, utilities etc.
 - Old facilities were built according to back-at-the-time valid regulations. When new regulations enter into force the old existing buildings usually have the right of continuance of operation without immediately adapting to the new laws. This right normally ceases when the old building is being

refurbished. Then the building has to be brought up to contemporary level of safety. This is a big problem with historically grown terminals, because the high cost to equip old structures with new technical building installations are often jeopardizing the entire project. This often leads to a “no-touch-of-old-structure” conduct (see FRA case). Consequently, it could not only be affecting the design but even endangering the PRG project.

- A new terminal expansion attached to old infrastructure brings up the question of compatibility with utility design at the interface. Increased capacity needs of electricity, water supply, heating etc. can cause a chain-reaction of utility and plant adjustments or alternatively lead to a new design imperative to provide self-sustaining systems and circuits.
- New upcoming projects at PRG
 - It is inherent to the complexity of an airport, that any additional development reshuffles the system. The cause at one end of the airport has an effect at the other end. This means that the new train station, the landside urban redevelopment (plaza), the new Tower etc. all can have an influence on terminal design.
 - The train station will rearrange the PAX-Flows situation at the terminal entrance and exit. Also kerb-side design might be affected.
 - The development at the landside plaza (Airport City developments?) are equally influential to the landside terminal as the station
 - A new tower location might conflict with the planned terminal zone which could then be resolved in an integrated design.
- Soil and ground water conditions
 - Adverse ground conditions have a great impact on the cost of a basement level. That in turn determines whether the technical equipment and machineries will be positioned underground or rather on top of the roof. With respect to the enormous impact on the piping and ducting concept through the building, this is one of the most relevant decisions to be made at the beginning of a design.

CAPABILITY CLAIM IV – EXPERIENCE IS KEY

The conditions and circumstances affecting the terminal design are numerous, highly interdependent and complex. An efficient and target-oriented elaboration of the PRG pre-design tasks demand for very experienced and specialized senior personnel.

- ➔ Planeground’s senior experts combine some 75yrs of experience at more than 100 airports – AND: they will do the job and not let the juniors take over!

2. APPROACH AND PROJECT ORGANIZATION

2.1 *Procedures to perform contract*

(related to ANNEX F to TD: i-v. – reporting; comments; data sharing; optimization; Value Engineering)

The following paragraph explicates how we intend to perform the project works in terms of scope, time, staff allocation and auxiliary methods and procedures.

1. *System for reporting project progress*

Our experience from past projects reveals, that for this kind of pre-design studies with a running-time of approximately 6 months a two-level reporting structure is sufficient:

- A. Working-level reporting – (ca. 2-weekly) comprising of: production of clear and to-the-point minutes of meetings of each conference session or working session with the client (personal as well as digital). The MoM will contain the brief description of subject of discussion; the points where clarification and/or agreement have been attained; the next duties to be delivered (indicating the responsible person and due date). Any particular wishes by the client in this regard can be met. The general postulate for this reporting level is: frequent, flexible and brief/to-the-point.
- B. Steering-level reporting – (ca 4-8 weekly) comprising of: higher-level information on progression of project, targeted at management-level and including delivery of (interim-) study reports i.e.
 - Inception report → week 1 or 2
 - Final report of Analysis Part → week 6-8
 - Interim Report on Conceptual Elaboration → week 12-14
 - Interim Report on functional terminal design → week 20-22
 - Various reports on technical feasibility → week 20-22
 - Final report of Design Part → week 26

2. *The treatment of comments and suggestions in the design*

It is plane ground's firm believe, that any comments, suggestions, fruitful exchange and even controversial discussions with the client ultimately lead to a better and more robust design. In fact, we regard our team as partners to the client in the project. Therefore, the team's entire work-flow - especially in the creative phases of the project – is dedicated to a constant and fruitful exchange with the client.

- We endorse our local presence in PRG and promote frequent on-site working sessions during the “creative phase of the project”. The personal interaction still proves to be the most inspirational and efficient way in a concept finding phase. Moreover, intensive and joint discussions on the various issues stimulate the mutual understanding of the subject matters and paves the way for a collective consent among the involved partners. The benefit of this approach is: At the end of the project the client is already convinced and committed to the solution.
- We work in iterative design loops while elaborating extensively on variants: Starting off with quick and rough sketches of an array of large-scale concept alternatives we gain insight in the range of viable options. By collectively discussing these options with the client we absorb the objections, suggestions and comments and are able to implement them in the next iterative design loop. We recommend to have informal evaluation sessions at least every 2 weeks in order to pursue a most efficient design process.
- In this approach of close exchange with the client, formal decision periods become less important. Nevertheless, in view of the tight project schedule we would suggest a decision period of not longer than 1 week. After that, the team will continue with reasonable basic assumptions.