SCOPE OF WORK

Preparing Busy General Aviation (GA) Airports for NextGen Technologies

Final: September 12, 2011

The Potential of NextGen

Next Generation Air Transportation System (NextGen) is an umbrella term for the ongoing transformation of the National Airspace System (NAS). At its most basic level, NextGen represents an evolution from a ground-based system of air traffic control to a satellite-based system of air traffic management. This evolution is vital to meeting future demand, and to avoiding gridlock in the sky and at our nation’s airports.

NextGen will open America’s skies to continued growth and increased safety while reducing aviation’s environmental impact. These goals will be realized through the use of Satellite Navigation, Global Positioning System (GPS), and other new technologies. NextGen will allow more aircraft to safely fly closer together on more direct routes, reducing delays and providing unprecedented benefits for the environment and the economy by reducing carbon emissions, fuel consumption, and noise.

Although new satellite and aircraft technologies are the foundation of NextGen, the nation’s airports will need to be prepared in order to take advantage of the new system’s benefits. The Federal Aviation Administration (FAA) defines specific criteria for airports to accommodate NextGen-type technology, and these criteria may require some airfield modifications to meet the applicable design standards. PSRC’s NextGen project is designed to help our region’s airports prepare for and realize the benefits of emerging technology.

NextGen technologies include airspace infrastructure enablers, new flight procedures, airport enhancements, and aircraft equipage that will be phased in over the next ten to fifteen years. In the near term (approximately 2-5 years), many of these technologies will become pervasive for the commercial air transport sector and their large destination airports. In this time frame, the early NextGen capabilities will also be available to the general aviation sector. In particular, busy general aviation airports have the near term opportunity to evaluate the costs and benefits of NextGen readiness and provide suitably equipped general aviation aircraft with significant operational advantages.

FAA Background

The FAA NextGen Implementation Plan targets 35 of the busiest air carrier airports in the nation (those previously designated as part of the Operational Evolution Partnership—OEP). Its 21st Century technologies will enhance safety, capacity, and all-weather accessibility at other airports where deployed. NextGen-type technologies that will benefit many users of non-OEP airports include Global Positioning System (GPS)-based instrument approach procedures such as Area Navigation (RNAV), Required Navigation Performance (RNP), and Wide Area Augmentation System (WAAS) Localizer Performance with Vertical Guidance (LPV). Other NextGen-type improvements for those airports, their
users and environs could also include Optimized Profile Descent (OPD—also known as Continuous Descent Arrivals, or CDAs) and Low Cost Ground Surveillance (LCGS) systems.

OEP- and most other air-carrier airports typically have precision instrument approach capability and other navigational aids (especially ground-based) more advanced than is common for most general aviation (GA) airports. However, an important component of our nation’s air transportation system, particularly for smaller communities, are the GA airports, which must provide reliable access in nearly all weather conditions. This is especially true for the operators of more sophisticated aircraft (i.e., business jets, turboprops, and helicopters) at the busier GA and reliever airports. This project will identify current gaps and airport improvements needed for the PSRC region’s busy GA airports to take advantage of improving technology.

FAA Objectives for the Project

This project will identify current gaps and airport improvements needed for the PSRC region’s busy GA airports to take advantage of improving technology. This work scope is based on a “model” work scope element template, developed by the FAA Northwest Mountain Region Airports Division (ANM-600). It was designed to be applied within an airport system planning context to help prepare busy GA airports to accommodate user demands with NextGen-type technologies. This project is tailored to meet the needs and goals of state and regional aviation system planning programs, while still providing the essential products that FAA needs to help direct investment resources most effectively. This initial project will focus on the Central Puget Sound Region. The project is organized into three phases, with Phase II containing five tasks as outlined below. Upon completion of the regional NextGen project, FAA and WSDOT Aviation may use the regional program as a template for a statewide NextGen effort.

PHASE I – PROJECT MANAGEMENT AND ADMINISTRATION

Preliminary Project Services

Preliminary services will include review and revision of the preliminary Scope of Work developed by the Puget Sound Regional Council (PSRC) to incorporate detailed descriptions of specific tasks to be performed. These descriptions will help to define the level of effort required to complete the project and assist in evaluating the fee proposal by an independent consultant as provided for in FAA AC 150/5100-14d. This phase includes meeting with PSRC representatives to finalize the scope, preparation of the consulting agreement and negotiating the final terms and conditions of the contract. Phase I will also include creation of a technical advisory committee (TAC), which may be comprised of representatives from airport sponsors, FAA, WSDOT Aviation Division, airlines, aircraft manufacturers, pilot and other airport user groups, PSRC, the consultants, and others as appropriate. The TAC will provide ongoing input and advice, will review draft products, and will provide direction to the project team (PSRC, FAA, and the consultants). The advisory committee will convene 3 times during the project, at the end of Task 2, Task 3, and Task 5.

Project management and administration will include monthly reports and billings (12 total), internal review meetings and periodic consultation with PSRC, FAA and Washington State DOT representatives as necessary. The consultant will also assist with preparation of project accounting and requests for reimbursement if required. The consultant will assist PSRC in creating a Technical Advisory Committee.
NextGen projects have the potential to improve airport access and enhance economic development. During Phase I the consultant will help PSRC staff identify opportunities to coordinate with WSDOT Aviation Division on the Statewide Airport Economic Impact Study (EIS). As appropriate, information will be shared between the NextGen work and the EIS project.

**Product:**
- Develop specific scope and fee proposal for the project.
- Attend kickoff meeting with PSRC to finalize scope.
- Technical Advisory Committee (TAC)
- Provide Project Management services throughout the term of the project including contract negotiations, overall management of project performance, communications with sponsor representatives, coordination and review of project team performance and scheduling.

**PHASE II – PLANNING PHASE**

**TASK 1: Identify Busy GA Airports**

**Objective:** The objective of this task is to define what a busy GA airport is relative to the system of airports in the state and the PSRC region. There is no standard definition for “busy” GA airport. The definition varies depending on the aviation activity at each airport. Common criteria include such metrics as annual aircraft operations and numbers of based aircraft. Measurements that focus more on the needs of the more sophisticated aircraft also include totals for annual instrument operations and jet fuel flowage.

**Approach:** Building on the 2009 Long Term Air Transportation Study (LATS) completed by WSDOT, develop qualitative and quantitative criteria by which to evaluate GA airports in the PSRC region. In relation to total airports in the state, within the PSRC region, and with FAA concurrence, determine which GA airports are considered “busy.” Within the context of this project, the intent of this task is to identify those airports which, due to their activity levels, user needs, and overall airport role, have the greatest potential need for, and could realize the most benefits from NextGen. Candidate busy GA airports for the PSRC region may cover a considerable range of physical attributes and operational applications. Within this context, the consultant will formulate and substantiate busy airport criteria based on any combination of the following, and possibly additional criteria that may emerge during the study; this criteria methodology may utilize weighing factors as appropriate:

**Element 1.1 – Tabulate and Analyze Operational Data**
- Number of based aircraft (total and percent of the region/state)
- Aircraft fleet mix (total and percent of the region/state)
- Number of annual operations (total and percent of the region/state)
- Number of annual itinerant operations (total and percent of the region/state)
- Number of annual instrument operations (total and percent of the region/state)
Element 1.2 – Tabulate Jet and 100 LL Fuel Flowage

- Jet fuel flowage
- 100 LL fuel flowage

Element 1.3 – Review Airport Role Documentation

- Reliever airports (FAA classification)
- Airport role: airports classified as “commercial service” or “regional” in the LATS study
- Airports with critical life safety roles, such as medevac and emergency response
- Airport impacts called out in long range local and regional transportation plans
- Local and regional population and demographic projections that may impact an airport
- Local economic projections that may increase based aircraft or change an airport’s fleet mix
- Community Interest
- Other measures defined by user need and potential benefit

Element 1.4 – Prepare Busy Airport Evaluation Matrix

This task will use the criteria listed above, and others as appropriate, to develop a matrix to objectively identify and justify a small number of airports in the PSRC area that qualify as busy GA airports. The region’s busy GA airports will then be evaluated as described in Tasks 2-5 below.

Element 1.5 – Review Preliminary Findings with PSRC

The consultant will develop a decision matrix to quantify the various factors deemed important to establishing a select “Busy Airport” classification. The consultant will plan and conduct a review and concurrence meeting with PSRC prior to finalizing task.

**Product:** Report including tabular data, maps (as needed), analysis details and narrative summary describing Task 1 approach and results, highlighting the airports defined as busy, with rationale for why they are considered busy.

**TASK 2: Inventory**

**Objective:** The objective of this task is to inventory the busy GA airports identified in Task 1. For purposes of this task, the primary goals are to increase the utility of busy GA airports that already have precision approaches, and to enable busy GA airports that do not already have at least one precision instrument approach procedure, or an approach procedure with vertical guidance (APV). Additional goals include obtaining a satellite-based APV, preferably with minima of 1 statute mile and 350’ height above touchdown (HAT) or better. In order to accomplish this goal, the airport must meet certain FAA design standards, including full-length parallel taxiway(s) at specified separation distance from the runway(s), a standard runway safety area (RSA), and other applicable criteria in Advisory Circular (AC) 150/5300-13, especially Appendix 16. To qualify for procedures development, the airport (runway) must also meet FAA’s Airports Graphical Information System (AGIS) survey and obstruction clearance criteria prescribed in the current editions of Advisory Circulars 150/5300-16, -17, and -18.

**Approach:** For the identified busy GA airports, use the approved airport layout plan (ALP), FAA Form 5010-1 and other sources to compile and tabulate the status of key airfield components (i.e., runway length, parallel taxiway, RSA, etc.) and instrument approach procedures for each busy GA airport.
Inventory existing airport field survey data, including locations of field survey monuments; coordinate with the Flight Procedures Office (FPO) as needed.

**Element 2.1 – Collect Existing Master Plan and ALP Documents**
For the “Busy Airports” identified in Task 1, the consultant will collect available local and regional planning documents, Airport Master Plans, ALP’s, FAA Aeronautical Data Distribution System (FADDS) information, and pertinent information available through the various FAA National Flight Data Center applications.

**Element 2.2 – Review of Existing Documents**
For the “Busy Airports” identified in Task 1, the consultant will perform a desktop review of the inventory information collected in Element 2.1 and begin populating the Site Inventory Checklist identified in Element 2.3 below.

**Element 2.3 – Prepare Preliminary Site Inventory Checklist**
The consultant will prepare a preliminary site inventory checklist that will be used to compile and tabulate the status of key airfield components (i.e., runway length, parallel taxiway, RSA, etc.) and instrument approach procedures for each busy GA airport.

**Element 2.4 – Conduct Site Visit Inventory**
The consultant will conduct on-site inspection to confirm the inventory data and to identify any unique factors that apply to each busy airport. It is anticipated that the on-site inspections will take place over a two week period including approximately ten airports. These site visits will be conducted by the to complete the Inventory Checklist and meet with the Airport Managers and Stakeholders to document existing conditions, planned improvements, and community interest.

**Element 2.5 – Review Preliminary Findings with PSRC**
The consultant will plan and conduct a review and concurrence meeting with PSRC prior to finalizing task.

**Product:** Report including tabular data, maps (as needed), analysis and narrative summary describing Task 2 approach and results. PSRC will provide maps and GIS graphic documents for inclusion in reports and presentations.

**Technical Advisory Committee (TAC) Meeting:** The consultant will provide presentation material and deliver a presentation to the advisory committee describing the process, analysis, and findings of Tasks 1 and 2.

**TASK 3: Gap Analysis**

**Objective:** The objective of this task is to identify the gaps between what the current inventory shows for each airport with the requirements to meet current design standards as well as the desired NextGen-type improvements.

**Approach:** For each busy GA airport, the consultant will compare the findings of Task 2 with the airport reference code (ARC) and determine the deficiencies in design standards, including those in AC 150/5300-13, Appendix 16, for the proposed instrument approach procedure(s). The consultant will
evaluate the airfield facilities relative to the identified deficiencies, and develop a program of improvements, in tabular and narrative form, as appropriate, for each airport, that would be required to correct the deficiencies and meet the applicable NextGen criteria. Based upon the inventory of field survey data from Task 2, the consultant will determine what additional surveying (meeting the criteria in Advisory Circulars 150/5300-16, -17, and -18) would be required to provide data suitable for AGIS as well as support development of electronic airport layout plans (eALP) and the desired instrument approach procedures. Where appropriate, the results of the gap analysis should be displayed in mapped form using GIS and other resources.

**Element 3.1– Correlate Inventory Data with Design Standards**
Using inventory checklist and Airplane Design Group (ADG) Design Standard Templates, the consultant will correlate the inventory data assembled in Task 2 with the FAA AC 150/5300-13 design standards for both the existing and ultimate ADGs of the PSRC Busy Airports identified in Task 1.

**Element 3.2– Identify Gaps and Prepare Preliminary CIP**
Using populated Design Standard Templates for each PSRC Busy Airport, the consultant will identify gaps showing the needed improvements for the given PSRC Busy Airport to meet the requirements of the NextGen instrument approach or systems. The consultant will identify preliminary associated costs throughout the gap analysis process.

**Element 3.3– Establish Need for Additional Survey Data**
Using the information included in the populated inventory checklist, and meetings with the Flight Procedures Office, the consultant will determine if additional survey data is required to establish one or more NextGen Instrument approaches and departures.

**Element 3.4– Analyze Airspace Constraints**
The consultant will analyze constraints and opportunities in the PSRC airspace with respect to developing new instrument approach procedures at the identified Busy Airports using NextGen technology and systems.

**Element 3.5– Evaluate the need for Detailed Procedure Analysis**
Using the information included in the populated inventory checklist, the consultant will evaluate if existing instrument approaches at PSRC Busy Airports can be improved to meet 350’ HAT and 1 mile visibility minimums. If an existing approach to a PSRC Busy Airport is not published or it is determined the minimums can’t be improved, a detailed procedure analysis will be recommended.

**Element 3.6– Review Preliminary Findings with PSRC**
The consultant will plan and conduct a review and concurrence meeting with PSRC prior to finalizing task.

**Product:** Report including tabular data, maps provided by PSRC, and narrative summary describing Task 3 approach and results for individual “Busy Airports” and the PSRC “Busy Airport” System calling out deficiencies or needs that may be applicable to several of the identified PSRC “Busy Airports.”

**Technical Advisory Committee (TAC) Meeting:** The consultant will provide presentation material and deliver a presentation to the advisory committee describing the process, analysis, and findings of Task 3.
**TASK 4: Implementation Plan**

**Objective:** The objective of this task is to produce a draft “capital improvement program” (CIP) for each busy GA airport specifically to document the resource needs to accomplish the improvements recommended in Task 3.¹ Since this task would not (in the system plan) consider financial feasibility, other facility needs at those airports or the sponsors’ existing CIP’s, the objective of this task is solely to establish “order-of-magnitude” project scope with planning-level cost estimates necessary to meet criteria solely for the NextGen-type improvements.

While it is the intent of the PSRC Implementation Plan to detail costs and funding for improvements to the “busy airports”, the 2011 NextGen Implementation Plan states that FAA plans to publish WAAS/LPV approach procedures for “all suitable runway ends by 2016”. Accordingly, the consultant will identify and prioritize beneficial improvements that may be considered beyond the short term (5 year) planning period. These recommendations will describe longer term and “evolving” technology advancements relating to the broad range of issues being addressed by the FAA. Examples of this technology and changing airspace environment include: ADS-B (in and out), public PBN approach, departure and STAR procedures, potential GPS spectrum interference, virtual control towers, etc.

**Approach:** Using applicable FAA Advisory Circulars, in concert with NextGen criteria, and with concurrence of WSDOT and FAA, the consultant will produce a CIP to meet these goals for specified busy GA airports in the PSRC region. It should be noted that the individual airport sponsors will determine how these projects would fit with their own master planning recommendations and their other priorities. It is anticipated that FAA will also use these results from the system plan to identify potential candidates for discretionary funding to meet NextGen-type goals for busy GA airports. This task will also include an indication of related projects which might best be implemented as a package in order to achieve regional benefits.

This project may identify physical improvements at busy GA airports. Such improvements would likely require permits, environmental clearance, and other approvals by airport sponsors and local governments. In addition, implementation of NextGen at busy GA airports may increase the overall activity levels at these airports, and may increase the activity of certain types of activity. There is potential for public opposition to the NextGen improvements due to their perceived impacts on local communities. To address this issue, Task 4 will include analysis of the projects listed on the CIP to identify potential for environment concerns and perhaps local opposition. Task 4 will outline the benefits of NextGen implementation, so that this information could be shared with airport sponsors and local agencies to garner public support.

**Element 4.1– Tabulate Project Priorities**
The consultant will present needed improvements in two tabulated formats: 1) in order of importance for each PSRC Busy Airport, and 2) in order of importance for the PSRC system of Busy Airports. The tabulated formats will also be presented in the short, medium, and long term time frames.

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¹ It is recognized, that for some locations, it may not be financially realistic—or even physically feasible—to implement the types of airport infrastructure improvements or approach protection required to support NextGen-type technologies. Where this is the case, it will be noted in the narrative, and no further implementation planning will be conducted for such locations in Task 4.
Element 4.2– Prepare Estimates of Infrastructure Cost
The consultant will prepare cost estimates in 2012 dollars for the tabulated project priorities presented in Element 4.1.

Element 4.3 – Evaluate Funding Sources
The consultant will evaluate and characterize potential funding sources for the infrastructure improvements shown in Element 4.1 and 4.2, as presented in tabular and narrative formats. In addition to Airport Improvement Program funding, the consultant will evaluate potential public / private partnerships at Busy Airport locations that have strong economic development opportunities that may be capitalized upon. These opportunities will be determined in part by coordinating the NextGen work with the WSDOT Economic Impact Study (EIS), which is running concurrently. Efforts will be made to include a NextGen component as part of the WSDOT economic impact analysis (see Task 5.4 below).

Element 4.4– Identify Funding Constraints
The consultant will identify improvement projects that are required to be accomplished and not eligible for federal, state, or local government funding. Project phasing that requires the expenditure of private funds prior to executing a project with public funds will be identified.

Element 4.5– Review Preliminary Findings with PSRC
The consultant will plan and conduct a review and concurrence meeting with PSRC prior to finalizing task.

Product: Report including tabular data, maps provided by PSRC (as needed), and narrative summary describing Task 4 approach and results. This will include a complete list (in tabular form) of all projects contained in the CIP, including the following information for each project:

- Project type (e.g., runway extension, parallel taxiway, land acquisition, obstruction removal, navaids, airspace changes, surveys, runway marking, approach lighting, building relocation, etc.)
- Project title
- Project location
- Project description
- Estimated cost
- Suggested timing for implementation (by year, decade, etc.)
- Identify general actions needed for implementation (funding, permits, local approvals)

Task 4 products will also include a brief summary of NextGen benefits. This will be prepared to support NextGen projects as a communication tool for local communities, to counteract possible opposition.

TASK 5: NextGen Analysis and System Applications

Objective: The objective of this task is to produce both quantitative and qualitative evaluation tools and considerations for Busy GA airport operators to utilize in evaluating options and making NextGen-related decisions and adjustments to airport master plans, airport layout plans, and airport strategic plans.

Approach: Using experience gained with consultant’s involvement with national and regional NextGen Early Implementation Projects (EIPs) and relationships with the FAA and airlines, the consultant will
develop candidate strategies to implement and use NextGen systems at PSRC Busy Airports. This analysis will focus on general aviation interests and airborne/ground component manufacturers’ product offerings and future strategies. The consultant will leverage as appropriate consultant’s experience and involvement with NextGen Early Implementation Projects (EIP) to accelerate the adoption of ADS-B, Performance Based Navigation, and other NextGen technologies, to formulate concepts for public-private partnership to achieve regional and national NextGen program objectives.

**Element 5.1– Identify Conflicting Runway Procedures**
For the PSRC System of Busy Airports, the consultant will evaluate existing and proposed instrument approach procedures and missed approach procedures for arrival and departure conflicts with other Busy Airports and Commercial Service Airports.

**Element 5.2– Review Environmental Constraints**
For Busy PSRC Airports where a NextGen instrument approach is recommended or where the minimums for an existing approach will be improved through the implementation of NextGen technologies, the consultant will evaluate and analyze environmental factors that may be impacted.

**Element 5.3– Evaluate RNP Opportunities**
For the PSRC Busy Airports that are constrained by residential development or constrained by existing flight paths or instrument approaches of other airports, the consultant will evaluate Required Navigation Performance (RNP) approach opportunities.

**Element 5.4– Define Potential Benefits to GA Stakeholders**
The consultant will assess both near term (2-5 years) and long-term (5-10 years) applicability of NextGen technologies. The consultant will consider positive impacts on airport community noise and mitigations to environmental sensitivity. The consultant will document the airport-specific and regional economic benefits derived from NextGen investments. For example, new businesses may be attracted to the PSRC Busy Airports because of newly installed NextGen compatible infrastructure and technologies. To the extent relevant data are available from the WSDOT Economic Impact Study (EIS), this information will be used in Element 5.4 to document the economic benefits of NextGen.

**Element 5.5– Prepare Estimates of Costs**
Some communities may have the financial resources and desire to get out in front of the NextGen transition that the National Airspace System is evolving into. The consultant will develop cost estimates for deploying locally funded NextGen applications such as a RNP approach procedures for the given PSRC Busy Airports where locally funded NextGen applications are identified.

**Element 5.6– Review Preliminary Findings with PSRC**
The consultant will plan and conduct a review and concurrence meeting with PSRC prior to finalizing task.

**Product:** Report including tabular data, maps provided by PSRC (as needed), and narrative summary describing Task 5 approach and results. Qualitative and quantitative estimates or lists will be provided to allow Busy GA airports to assess the impact of NextGen airport capability on airport traffic capacity, economic development, client attraction, and community intangibles. The report will consider four elements of NextGen technologies and their respective potential impact on Busy GA airports: airspace infrastructure enablers, new flight procedures, airport enhancements, and aircraft equipage.
Strategies will be identified to mitigate perceived impact on community noise and environmental sensitivity to application of NextGen technologies and the possibilities of increased operational traffic.

As applicable, two time frames will be addressed; near term (2-5 years) and long term (5-10 years). A key objective of Task 5 is to allow Busy GA airports to assess compatibility of NextGen costs and benefits, and integrate NextGen projects into existing airport master plans, airport layout plans, and airport strategic plans. A list of questions, precedents, and benefits will be delivered to allow PSRC to consider the applicability and benefits of FAA EIPs, public/private partnerships, and/or joint multi-airport projects.

**Technical Advisory Committee (TAC) Meeting:** The consultant will provide presentation material and deliver a presentation to the advisory committee describing the process, analysis, and findings of Tasks 4 and 5.

**PHASE III – DOCUMENTATION AND CLOSEOUT**

**Narrative Report, Review Meeting Participation and Presentations**

This phase of the project includes the effort of writing, review, editing and reproduction of the narrative final report. The consultant will prepare and submit a draft report for review and comment by PSRC. After addressing PSRC comments, the consultant will provide a print ready version of the final report, along with an electronic .pdf file for posting on the PSRC website.

This phase also includes preparation of presentation materials as follows: presentation for the review meeting with PSRC associated with each task; presentations for quarterly (or as needed) progress meetings with Stakeholders and PSRC; and an overview presentation to accompany the final narrative report. Interim electronic media will also be provided at the conclusion of each task in DRAFT format.