



AIRCRAFT HANGAR DEVELOPMENT GUIDE

A VALUABLE AIRPORT RESOURCE





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The AOPA Airport Support Network program was introduced in 1997 to help members preserve general aviation airports throughout the United States. Today, AOPA works with over 2,000 Airport Support Network volunteers to promote, protect, and defend America's community airports.

This Aircraft Hangar Development Guide is another in a series of publications AOPA has created to help volunteers keep their airport healthy, vibrant and growing.



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Introduction

Storage for an aircraft is important to any aircraft owner. You want to keep it (or them) out of the elements when you are not using them. Unfortunately, not all general aviation airports are equipped with sufficient hangars to store the number of aircraft that are in need.

Building new hangars can fill that need, attract new businesses and generate additional revenue for the airport. In fact, a well-executed and successful hangar project can be the key to a financially secure GA airport.

The Aircraft Hangar Development Guide is designed to help you and your airport owner develop a project management strategy to successfully plan, design, and complete a new hangar development project at your airport. We will cover project scoping, financial justification, preliminary design and budgeting, funding, approvals, construction, and moving in, as well as help you anticipate the challenges that can affect a hangar project.

This comprehensive guide has been tailored to meet the needs of a typical GA airport. Some tips may not apply to your airport, and your locale may not face the same planning complexities as others, but it covers many of the details you will need for a hangar development project, with checklists at the end of each section make it easy to determine if you are ready to move to the next phase of the project.

This guide also includes references to publications by the Aircraft Owners and Pilots Association (AOPA) and the Federal Aviation Administration (FAA) to provide you with additional information about building hangars.

There are five basic steps to planning and executing a successful hangar project. The following flow chart details how each step fits together.

Every step is equally important, but the first three are the most important to ensure the success of a hangar project. Many projects fail because the planning steps are skipped in lieu of project execution steps. Jumping into project execution before proper planning has been done guarantees a costlier, more difficult, time-consuming project, and an increased likelihood of project failure. It is also important to perform a 'lessons learned' evaluation when the project is finished to show the strengths and weakness in the process that can be improved upon for future projects and promote the successful operation of your new hangars.

Buy-in from key stakeholders is also essential for a project to flow smoothly and be completed successfully. Building a compelling business case in Step Two is critical to that process (See Appendix III "Is Your Business Case Compelling?"). This approach will produce a greater rate of acceptance, support, and commitment from all interested parties and lead to a cost efficient and timely project.



STEP ONE
Where are we now?



STEP TWO
Where do we want to be?



STEP THREE
How do we get there?



STEP FOUR
Project execution



STEP FIVE
Project evaluation



“ In fact, a well-executed and successful hangar project can be the key to a financially secure GA airport.

Step I : Where Are We Now?

The first step is to assess the current state of your airport. How well does it operate? Is a hangar project there viable?

You will need to quantify the demand and need for hangars, assess the “environment” of the airport, familiarize yourself with the FAA requirements and regulations that govern airport development, and start working on the support you will need from key decision makers.

Before you begin, you want to identify the key players who will contribute to this project. The team could include airport owner representatives, engineering consultants, and airport supporters.

DETERMINE NEED

Who and how many might be interested in having a new hangar at your airport? Your airport likely has a hangar waiting list that will tell you what the demand is. The list does not always accurately reflect the actual demand for space, as pilots may have their names on lists at neighboring airports, they may not currently own an aircraft. Your airport may not even have a list, so you may need to do a little legwork to gauge interest. An email to pilots in the airport’s service area is an efficient way to get started. If you get positive feedback and want to take it a step further with serious commitment, consider offering a spot on the waiting list for a cash deposit. Regardless of how you address this, it is incumbent on whoever manages the waiting list to do so fairly and equitably—never allow back room deals to influence priority on the list.

Next, you need to decide what type of hangar will best serve the demand of your tenants and be most appropriate at your airport. Nested T-hangars are attractive to potential renters because they provide the greatest degree of weather protection and security. Shade hangars have a structurally supported roof but open sides (no walls).

Portable hangars are less expensive to build, less durable and generate less revenue. Box hangars are attractive to owners of larger aircraft, and can be quite expensive to build, but they also generate significant revenue.

ANALYZE THE AIRPORT ENVIRONMENT

Understanding your airport’s environment is vitally important to your hangar project, and often is overlooked in planning. Airport supporters often presume that if there is a demand for hangars, they should just be built. But before you start fundraising, it is critical to research all aspects of the airport environment. That includes airport owner support, community support, the airport masterplan, zoning and land use, environmental issues, airport community design standards, airport tenant support, availability of project funding, and the current airport financial situation.

Airport Owner Support: Whether the airport is privately owned or city, county, or even state owned, you will need a lot of help and support to successfully execute a hangar project. Identify the key decision makers early, because you will need their support on funding applications, permits, and contractor bids. You will need support from the airport manager, airport commission, city or county council, planning department, and senior city or county staff members. If you don’t have solid owner support for your hangar project, you will be fighting an uphill battle the entire way.

Community Support: It will also be very difficult to complete a hangar project without community support. A lack of complaints from your airport’s neighbors doesn’t mean you have their support.

Airport Master Plan: A master plan is a document approved by the FAA that describes the fully built-out capacity of the airport and the plans for achieving it. It also includes an FAA-approved airport layout diagram that illustrates current and future development plans. Every airport should have an up-to-date version. It is critical that your hangar project is depicted on this diagram early in the planning phase because FAA grant funding, as it may apply to your project, will be based on the airport layout plan.

Zoning and Land Use: The airport probably has requirements that govern how land can be used or developed. Areas of the airport property may be limited to commercial development, designated for aircraft storage, or a combination of the two. Some of the land may be required to remain free from development. If the area available for hangars is not zoned appropriately, you will need to correct that issue first. Consult AOPA's *Guide*



“Your local FAA Airport District Office (ADO) can be [helpful](#) when working through [environmental issues](#), and AOPA can provide technical assistance.

to Airport Noise and Compatible Land Use for basic guidelines on sound land-use planning.

Environmental Issues: Check with your planning department, community development staff, or whatever organization has land-use jurisdiction at the airport, to assess the need for an environmental impact report (EIR). It will be important to the airport owner to know how an EIR will affect the hangar project. Environmental issues can be difficult to deal with during airport development and typically include noise, traffic, water runoff, water use, soil impact/degradation, visual impact, and vegetation

or animal impacts. Use an up-to-date master plan to address all issues based on maximum airport built-out capacity.

Your local FAA Airport District Office (ADO) can be helpful when working through environmental issues, and AOPA can provide technical assistance. An EIR can be time consuming and expensive, so plan accordingly if this becomes unavoidable. In some cases, EIR requirements have made hangar projects financially untenable.

Airport Community Design Standards: Community design standards usually apply to the architectural design of buildings, including hangars. This may not apply to all airports, but it should be checked. There may be restrictions on building size, shape, color, materials, and provisions for support infrastructure (parking and handicap access). The airport owner should be able to supply a copy of design standards, if they exist for your airport. These standards can impact the cost of your project, and consequently, your business plan.

Airport Tenant Support: Not everyone at the airport is going to be as enthusiastic to have a new hangar as those on a waiting list. Existing on-airport businesses may

see a new hangar as a threat, especially if it requires some of the property the businesses lease or creates competition. You might need to review or modify existing hangar lease documents to address existing or potential conflicts. Determine the level of support you need from current on-airport businesses and tenants to avoid problems with moving the hangar project forward.

Availability of Project Funding: The primary sources of funding for your hangar project will be through existing airport revenues, state aviation fund grants or loans, municipal bonds, and public or private loans. In some circumstances, FAA Airport Improvement Program (AIP) funding may be available thanks to changes made by

LIST OF TYPICAL REVENUE AND EXPENSE LINE ITEMS

REVENUES		EXPENSES	
<ul style="list-style-type: none"> • Tiedown rent • Hangar rent • Ground leases • On-airport business leases • Fuel sales 	<ul style="list-style-type: none"> • Personal property tax • Airline ticket tax (for commercial service airports only) • Interest 	<ul style="list-style-type: none"> • Salaries & wages • Debt service (loan payments) • Fuel purchases • Maintenance and repair • Office supplies • Hazardous waste disposal 	<ul style="list-style-type: none"> • Utilities • Owner overhead charges • Insurance and risk management • Depreciation charges
<p>REVENUES: For most GA airports, fuel sales and rent generate the largest portion of revenues. But personal property tax also generates revenue. This is handled differently across the United States depending on city, county, and state law. However, it typically is paid by aircraft owners based on the assessed value of their aircraft. In some cases, a portion of the total payments can be returned to the airport. The airport owner and the tax agency can agree upon a funding arrangement. For example, a county might levy the tax and agree to return a portion of it to the airport.</p>		<p>EXPENSES: Debt service is typically the largest expense for airports that have continuous development. However, salaries, overhead charges, and fuel purchases might be the biggest expenses at airports where development has been spotty.</p>	

Congress in 2003. Vision 100, now Public Law 108-176, allows for the use of AIP funds to construct hangar projects on non-primary airports, provided the airport sponsor has a plan in place to fund all airside development needs first. The local FAA ADO can provide additional information on this program.

Grants through the AIP come with obligations that are intended to support sound financial practices and management of the airport, and to ensure that the FAA's investment is secure. The FAA requires that all grant eligible elements of the hangar project be included on the airport capital improvement project (ACIP) list. The FAA ADO handles these documents, which amount to an airport wish list. If parts of the hangar project that you expect to be funded by an FAA grant are not included on this list, they won't get approved. Long lead times are associated with ACIP list processing and receiving grant funds or other forms of financing for a publicly owned airport, so allow time for this in your business plan and project planning.

To help you understand the obligations associated with FAA grants, the FAA has published two valuable documents: Airport Compliance Requirements Order 5190.6B and FAA Policy and Procedures Concerning the Use of Airport Revenue. Copies of these are available from the FAA's website (www.faa.gov) or from any FAA ADO. A working knowledge of these documents will help you create a sound business plan. It will also be handy when interacting with airport owners and decision makers whose support are needed to successfully execute the project.

If your hangar project is a private development, funding will not be as much of an issue. Check with the airport owner's financial staff for information on sources of private funding. Contact an engineering

or aviation consulting firm that specializes in airport project funding to determine the availability of funding for your project.

Current Airport Financial Situation:

Airport supporters and owners often do not fully understand the financial situation of their airport and learning about it can be time consuming and require significant effort. You want to address the financial stability of your airport before proceeding with the hangar project.

Whoever manages your airport's finances should be able to help you find the necessary documents to review for your project. Monthly revenue and expense statements will determine if the airport's financial situation can support a hangar project. Review several years' worth of statements to see how revenues and expenses have tracked over time. If your airport has been running deficits, the local owning entity will be less likely to burden the operation with additional debt. This will make it more difficult to convince them to build hangars. If a long-term deficit exists, you might need to address that before beginning the hangar project, but keep in mind, a well-planned hangar development project could have a positive financial impact on an airport.

Depreciation is usually a year-end charge, representing how an investment's value diminishes over time to account for wear and tear. A new hangar put into service will "reduce in value" on the airport financial statement year by year. However, if an airport were to generate enough revenue to cover depreciation charges, it would build a reserve fund to cover the cost of repair and replacement of the hangars without the need for loans or grants. Unfortunately, few airports do this. (See Appendix I "Airport Revenue and Expense Financial Analysis.")

CHECKLIST FOR STEP 1

- Quantify & valueate hangar demand
- Assess level of current support for airport
- Identify key decision makers
- Asses level of current community support
- Identify zoning & land use issues
- Confirm airport master plan in place
- Assess environmental issues, preliminary judgement in hand
- Review airport design standards
- Assess level of current airport tenant support
- Determine availability of project funding
- Establish project team
- Decision to proceed in hand
- Review airport finances



Step 2 : Where do we Want to Be?

With the gathering of information and analysis in Step One complete, you are prepared to move on to Step Two: addressing the scope of your hangar project.

When you determine the best approach to development, conduct a Strengths, Weaknesses, Opportunities, and Threats or SWOT analysis, determine boundary conditions, identify key stakeholders and decision makers, and create a compelling business plan for your approach.

EXPLORE APPROACHES

There are three typical approaches to getting a new hangar built, each with pros and cons (see comparison charts below): a private company owns the hangars on leased airport property and uses it privately; the airport owner can build the hangars and rent them to airport tenants; or the land can be leased to a private developer who will build and rent the hangars to airport tenants. Analysis of the options will help you determine which is best for your situation.

Generating revenue is an important goal for any GA airport, so having an airport owner driven hangar project is usually the best approach. Finding a private source for funding, construction, and operation is a viable alternative if the airport owner is not supportive. The key will be your financial analysis.

ESTIMATE FINANCIAL IMPACT

It is critical to assess the financial impact of each approach to a hangar project on the airport's operation. Analyze the past financial history of the airport's operation including revenue, operating expenses, and capital costs/loan obligation payments against the impact of the new hangars and estimate the result. Remember to include increased fuel sales revenue (and the other miscellaneous items that would increase)

	PRIVATE DEVELOPMENT	AIRPORT OWNER DEVELOPMENT
PROS	<ul style="list-style-type: none"> No up-front owner investment required No owner management needed No occupancy risk One entity to deal with 	<ul style="list-style-type: none"> Good demand Highest revenue flow to airport Built to airport owner specs Greatest control to ensure compliance with airport rules
CONS	<ul style="list-style-type: none"> Lower revenue because open land is leased, limiting control of future rent increases Management of hangar waiting list can be problematic Owner may lose asset appreciation depending on lease terms 	<ul style="list-style-type: none"> Airport owner management oversight needed Potentially highest capital cost Maintenance costs come from airport budget

based on the number of aircraft based at the airport. Prior projects and neighboring airports are a good, cost-effective source for information like this, but an airport consultant or engineering contractor can also generate estimates.

With this information, you can run financial projections out at least 10 years, applying inflation-based adjustments for operating expenses and revenues. During this 10-year period, you will likely see existing loans paid off, generating the potential for increased positive cash flow as well as other benefits. It is important to include this information in the final business plan as justification for the project. A copy of a typical financial projection, or proforma, is included in Appendix II.

ANALYZE PROJECT STRENGTHS, WEAKNESSES, OPPORTUNITIES, AND THREATS (SWOT)

SWOT analysis of a project is the best way to assess the impact your hangar project will have on your airport's stakeholders. A group of project proponents working together on SWOT analysis and interviewing key decision makers or stakeholders can uncover potential issues more quickly than doing it alone. You will likely discover things you can use to your advantage or issues that you can address in the early stages of project planning to limit their possible negative impact.

Once you have completed the SWOT analysis, you will have a better idea of where to focus your energy as you start generating support from the decision makers and stakeholders for the project.

ANALYZE BOUNDARY CONDITIONS

Boundary conditions are the "givens" surrounding the project. They are the constraints on the project that you will not be able to change and it is better to know them early and include them in your initial planning than to jeopardize the project with the unknowns when it's too late.

You may find issues that require attention as you identify the boundaries, put the business plan together, and deal with stakeholders during project execution. Determine who the decision maker is, who will provide approvals, and if the decision maker will change during project development.

IDENTIFY STAKEHOLDERS

A stakeholder is any person or group who has an interest in or will be impacted by the hangar project. Once you have identified the stakeholders, determine their level of support. This will help you

EXAMPLES FROM A SWOT ANALYSIS



Strengths

- History of success
- Full hangar waiting list
- City council support
- Available FAA, state funding
- Contractors committed to airport
- Generally good community relations



Weakness

- Airport manager has minimal project experience
- Possible tenant resistance
- Unknown degree of owner support & staff availability
- Unknown potential neighbor resistance



Opportunities

- Provides increased revenues for the airport
- More satisfied airport customers
- Increased airport business opportunities
- Transportation infrastructure improvements



Threats

- Obstacles to progress created by current tenants
- Unknown community resistance
- Airport Improvement Program is not funded by Congress (a possibility only)
- Developer or other party has conflicting interest

STAKEHOLDER ANALYSIS TOOL

NAME	LEVEL OF SUPPORT	CONCERNS	DESIRED BEHAVIOR	INFLUENCE STRATEGY
People on hangar waiting list	5	Want hangars ASAP	Support	Keep informed
Current airport Tenants	4	Want hangars ASAP	Support	Keep informed
Business Tenants	1,4	Competition from new businesses	Reduced Resistance	Demonstrate Equity in costs
Airport Commission	5	Project Success	Demonstrate Support	Keep informed
City Hall	3	Project problems & financial obligations	Supportive, involved as appropriate	Reduce need for active involvement, project self-supporting
Community	3	Noise, Safety	Nominal Support	Keep Informed
FAA, state	4	Execute project and use their procedures	Satisfaction	Keep informed & use their procedures
Contractors	5	Open dialogue	Active planner	Open dialogue continuously

Use the Stakeholder Analysis data to boost support for the project and minimize opposition

1 Strongly Oppose
 2 Moderately Oppose
 3 Neutral
 4 Moderately Support
 5 Strongly Support

manage the level of acceptance and commitment for your project—strong allies can influence those who show little support.

Use SWOT analysis to create strategies to increase commitment from key stakeholders. Ask yourself: “What would our stakeholders say about the project if it was a success?” or “What are their views of the airport operation today?” With these answers, you can develop strategies to get their support.

Keep in mind that stakeholder responsibilities will change over time as issues are addressed or new stakeholders are identified.

CREATE A BUSINESS PLAN

Now that you have a thoroughly researched document, a compelling financial statement for your selected approach, and a plan to deal with most of the issues from decision makers and stakeholders, it’s time to create the business plan. Appendix III provides tips to help

you write a compelling business plan. The elements from the first two project steps will help you to build credibility with the key decision makers and stakeholders, which will pay dividends as the project progresses.

Even if you don’t face all of the issues explained in this guide or need to create an elaborate business



CHECKLIST FOR STEP 2

- Explore alternatives
- Estimate the financial impact
- Complete a swot analysis
- Review the boundary conditions
- Select decision makers
- Complete a stakeholder analysis
- Select desired alternative
- Report best alternative to decision makers
- Confirm project team members
- Prepare and present business plan to decision makers
- Decision to proceed in hand



Step 3



Step 3 : How Do We Get There?

Before you start developing the preferred hangar approach, take time to define the seven key project management principles that will help to ensure a successful hangar project:

create the team, frame the project, build stakeholder support, get your project estimates, find your funding, prepare the appropriate financing documentation, and identify the approval steps.

CREATE THE PROJECT TEAM

You may be the driving force behind the project and not have an official team, but over the lifespan of your project, there will be many participants that come and go. To effectively develop your team, ensure that everyone agrees with the scope of the project and each is clear on his or her roles and responsibilities. Each individual should commit to what is expected and understand the importance of meeting deadlines. It is up to you to ensure that each member has the resources needed to meet those deadlines.

With the Project Team identified, you can now create preliminary design and budget estimates, identify funding sources, and determine the project review and approval process.

FRAME AND PLAN THE PROJECT

Project framing builds on the work done during “Project Planning – Step Two”: boundary conditions,

prevent “project scope creep.” Project scope creep happens when the project scope is not clearly defined, documented or controlled. A project frame that is too wide can become overwhelming; too narrow and you might miss critical elements needed for the project. Define the frame early and keep it on track.

BUILD STAKEHOLDER SUPPORT

Start the conversation with your stakeholders. Meet with them and use your stakeholder analysis tool (see page 12) to assess their level of support. Share your completed preliminary hangar project plans with them, and assess their level of support to identify possible obstacles.

It can be difficult to get their attention, so hook them on the value of your project early in the discussion. Most city hall decision makers have no idea how their local airport benefits the community. The financial analysis of the positive impact of your hangar project articulates the importance of it to the health of the airport’s operation, especially when your team is speaking with the airport owner’s key senior staff, city council, or other final decision-makers to discuss plans for the long-term financial health of the airport. Most politicians and senior staff want an airport to be as self-

“To effectively develop your team, ensure that everyone agrees with the scope of the project and each is clear on his or her roles and responsibilities.

SWOT analysis, and the preliminary stakeholder analysis. For a hangar project, this is straightforward. A concise project frame will focus everyone involved on what needs to be accomplished and will help

sustaining as possible, so proof of the financial benefit will support your requests.

When you come prepared with thorough information about your proposal, you begin to build credibility with stakeholders—an important step toward gaining their support. While you are increasing their awareness of your project and the airport’s value, explain exactly what you need from them. Ask for their support when the project comes up for approval, request their help with financing, or getting a special variance on potential roadblocks.

Thank them! When stakeholders demonstrate interest, explain the impact their support has on the project and show your gratitude. They will appreciate the recognition. If they don’t follow through on your requests, don’t let that stop you. Make another contact and keep moving forward. Recognize that you might not be able to change the mind of a key stakeholder and include it in your project plans. As you progress through the project, be sure that you don’t unintentionally do something that would increase their resistance.

PRELIMINARY PROJECT ESTIMATES

In Step Two, you looked at past hangar project costs to estimate the cost of your own and assess the best possible approach for your project. Now, you will need to refine your estimate to include current design, construction, material, and support costs.

You may want to consider hiring an engineering design firm that specializes in airports to do the

preliminary project design and budget estimates. Many airports have an engineering firm on a “standing contract” basis to do miscellaneous consulting work. If your airport does not, you will need to go through a bidding and “standing contract” award process to select one, especially if your airport is municipally, county, or state owned. Check with the airport owner’s senior staff.

Be certain that you have sufficient project funds to compensate the engineering firm. Often, there are sufficient funds in the airport’s operating budget. If not, you may need to request a short-term loan from the airport owner that will be repaid with funds from your

“It is better to prepare for the worst than risk putting the project in jeopardy over lack of preparation.

financing source. Obtaining extra funding for the project should be easier thanks to the work you did earlier to build credibility, show the value of the airport, and gain support from key decision makers.

If you opt to work with an engineering contractor, you will want to integrate them into the project planning as soon as possible. The contractor’s expertise can be invaluable in refining the scope, boundary conditions, project cost estimates, and funding resources.

You also can begin the preliminary design and budget estimate work.

IDENTIFY FUNDING SOURCES

There are infinite sources of funding available, including grants, public or private loans, and bond issues. Some are quite sophisticated and may require some creativity to get the combination best suited to your project and airport financial situation. Some of the more common methods of financing will be covered in this guide.

As noted earlier, the FAA has Airport Improvement Program (AIP) grants designed specifically for construction, development, and expansion of U.S. airports. FAA grants can be used to pay for utilities, some underground

work, paving of ramps and taxiways, and even fencing, gates, and lighting systems. These grants can cover up to 95 percent of the cost of qualifying aspects of an airport expansion, with the remainder as “matching funds” coming from the airport owner.

The process of applying and being approved for such a grant from the FAA is not difficult, but it can be time consuming and requires specific knowledge of the FAA AIP grant process. Airport engineering firms can combine the project design



and funding application process. The engineering consultant should be able to tell you which approach is best for your airport. Aviation loan and grant consultants also specialize in helping airports apply for these grants. Regardless of which approach you use, you will need to cover the matching portion of your grant from other funding sources.

Keep in mind that federal law limits how AIP grant money can be used at a public-use airport. This covers the hangar building including foundations, and some of the paving in front of the hangar doors, but not strictly revenue-producing parts of the project. How to pay for ineligible parts of your hangar project is where you may need to get creative.

The airport owner's financial staff should be able to help here. Show them the detailed project plans, go over your ideas about financing, and enlist their help to contact lending institutions, bond issuers, and other financial resources. The airport owner may be willing to loan airport operations the money from his or her own general revenue fund. In any case, you should have a better idea of your options once you've involved them in your quest for funding.

Some state governments have aviation loan programs designed to supplement the AIP. These loan programs are often funded by state aviation fuel taxes and are self-perpetuating given the loan payments are made back into the program.

If you decide to work with a private developer for your hangar project, there will likely be parts of the airport infrastructure that they cannot provide, such as utilities to the site, taxiway extensions, security fencing, or area lighting systems. In this case, an AIP grant may be applicable to cover the cost of accessing these areas. You probably will need to hire an engineering consultant to design and manage the details between your private developer and the airport.

Don't be surprised if construction bids come in higher than anticipated. Plan for this, to prevent an unexpected surprise. It is better to prepare for the worst than risk putting the project in jeopardy over lack of preparation. For example, you could evaluate the impact of reducing the project scope; you could check to see what additional loan or other financial resources might be available; or you could assess the impact of higher hangar rental rates to cover the additional costs. If your project is still viable—even if faced with a significant (20 percent or more) overrun—then you will know that the project is on firm footing to move forward.

SEVEN KEY PRINCIPLES OF PROJECT MANAGEMENT

1. Clear direction

Be certain that everyone involved is clear on his or her roles and responsibilities, the required project approvals, and the way decisions will be made.

2. Sponsorship

Be certain that you have the necessary support for the project from the airport owner and other key stakeholders each step of the way.

3. Communications

Develop a communications plan in order to keep all stakeholders, future tenants, and elected officials informed on progress of the hangar development. Ensure that all stakeholders are included in your communications plan. The objective is to reduce surprises and potential resistance.

4. Engagement

The airport owner and stakeholders will need to be engaged and supportive of the project at different levels and points in time. Establish and confirm the needed level of involvement or support before you proceed.

5. Shaping and reinforcement

Once you've established the level of support needed, use the stakeholder analysis (created in Step Two) to assess any gaps between the sponsors' current level of support and the level of support needed. Develop plans to shape the behaviors you need from each sponsor and reinforce the desired ones.

6. Measurement

Establish qualitative and quantitative criteria at each project step to track progress. During each step, ask yourself, "What would success look like?"

7. Plan modification

Once your plan is established, don't assume it will never need to be changed or updated. Changes are continual on any project; don't ignore or assume everything is as it seems or will be. Frequently update and reassess your plans to make sure it is current.

PREPARE FINANCIAL DOCUMENTATION

You have identified the available funding sources and finalized funding plans, but your financial work is not over yet. You or your airport owner’s financial staff will also need to prepare a detailed financial projection, or project proforma, for the term of your project’s funding. This allows the financial institutions that are providing funding to evaluate the project and decide the amount to give. The FAA will also want to be assured that your project is well conceived and financially reasonable.

This project proforma is just an expansion of the work you have already done to gain stakeholder support. By this point, you should

have more accurate information from the engineering design consultant’s preliminary design that you can use to project cost estimate and revenue and expenses that you will use to complete your project proforma. A sample project proforma is included in Appendix II. The project proforma will be used in Step Four when you obtain funding. Remember to include all known future expenses, such as fuel system replacement, in your projections. The project proforma will be a powerful tool when meeting with decision makers and working to positively influence other key stakeholders of the value of your project.

If you decide to pursue private development, you will need to check with the FAA to see what kind of financial projections they require.

IDENTIFY REVIEW AND APPROVAL STEPS

All the work you’ve done to this point has been directed toward creating support from key stakeholders and decision makers for the most attractive hangar project at the airport. Your project scope is defined and you have a funding plan that is financially credible. Now, you need to start planning the review and approval steps and build the timeline into your overall project plan. An airport project will impact many different areas of the airport owner’s responsibilities and jurisdiction and



specific stakeholders might require multiple reviews and approvals during different stages of the project. You may not need to have your project reviewed and approved by all of the following entities, but it is wise to be prepared for them.

The city/county council or commission, the mayor or county supervisor, and the airport commission all probably will need to be involved in the approval process to hire an engineering consultant, apply for FAA grants or loans, request construction bids, award a construction contract, and accept the completed project.

A planning department or commission may be involved in the

overall plan approval, architectural review, land-use review, and environmental impact review. The project also will need to be reviewed and approved by the legal and financial departments of the local government involved. Other commissions and committees might need a say in a bicycle/pedestrian review, landscaping, public access and security, and noise and traffic concerns. The fire marshal, police department, and public works/parks and recreation department probably will need to participate as well.

The review and approval process are where the relationship you have with your stakeholders can facilitate the process. Consult with them about what is necessary to proceed. You

might find that you can negotiate away several of these steps that are not appropriate to the project. Often the individuals involved in reviewing the project or granting approval to proceed are unfamiliar with how airports operate.

Planning ahead for the review and approval process helps to uncover issues you missed in your earlier planning. Finding these before the review and approval phase will limit the surprises you could face in the future. With all of this information and a compelling business case in hand, you should be able to get a decision to proceed.

FINANCIAL FUNDING ALTERNATIVES SUMMARY

- **FAA AIP GRANTS**
Contact the local FAA ADO, an engineering consultant, or airport financial consultant.
- **STATE/COUNTY AVIATION LOAN PROGRAM**
Contact the appropriate aviation department.
- **AIRPORT OWNER**
Check with the finance department about financing from the airport general fund or community development programs.
- **MUNICIPAL/COUNTY BOND ISSUES**
Finance department staff can help, & investment bankers can handle bond issues. *(These can take some time to put together, so plan accordingly.)*
- **BANK LOAN**
Check with the finance department staff.
- **PRIVATE DEVELOPMENT FUNDING**
The private hangar developer will provide his or her own financing, but you probably will need to seek additional funding

CHECKLIST FOR STEP 3

- Complete project framing
- Build stakeholder support
- Prepare project team
- Create preliminary project estimates
- Identify funding sources
- Prepare financial documentation
- Identify review and approval steps
- Decision to proceed in hand

Step 4 : Project Execution

Many hangar projects are erroneously started in what should be the fourth step—project execution. Bypassing the first three planning steps usually leads to frustration and project failure. If you have turned to this section in an attempt to shorten the process, go back to the beginning. Following this guide step by step will ultimately save you time, effort, and money.

All of the project pre-planning and preparation to this point begins to pay off. During the project execution phase you will complete the project design and funding, solicit bids, award the construction contract, build the hangars, and move tenants in. In this phase, it also is important to implement the seven principles of project management discussed in Step Three (page 15). There will be changes that must be incorporated into the project plan (change in funding sources, regulations, stakeholders, size of project scope), and using these principles can ensure the best possible outcome.

PROJECT DESIGN AND FUNDING

By this point, you should have decided whether to have the hangar project done privately by a developer or publicly by the airport owner. The choice you make will determine your degree of involvement going forward. Some of the responsibilities of each option are detailed in this section.

Privately Built and Managed: The private ownership and management option requires a land lease or purchase agreement between the airport owner and private developer. The airport owner will likely prepare these documents but you should be involved—your knowledge of and work on the project will be valuable.

If a developer is allowed to purchase airport property, it is vitally important that the FAA becomes involved early in the discussions because the agency has stringent requirements governing such matters. Any sale of airport property must receive FAA approval and be conducted at full fair market value, with proceeds going to the airport.

If the developer will be leasing airport property, consider the appropriate term of the lease. (Typical leases run 25 to 30 years; however, in some cases, the lease term may be tied to the level of capital development proposed.) Establish what will happen to the hangars after the lease expires: Will the lease be eligible for extensions? How many? Will the hangars revert to the airport owner at the end of the lease term? The final terms of any lease should hinge on the length of the lease term as well as the level of investment involved. Be sure to include a clause in the lease that allows the airport owner to be involved in the hangar project. This ensures that building codes, permits, inspection requirements, and the like are met.

You will need to assist the developer throughout the project to obtain any required permits, integrate the project into existing airport infrastructure, obtain funding and project management for non-developer portions of the project, and monitor the progress of construction. You will also be responsible for resolving any issues that may arise between the developer and airport owner representatives. Participating in the final inspection and acceptance of hangars and ensuring compliance of the lease agreements will also be a priority.

Airport Owner-Built and -Managed: If the airport owner is going to build and manage the hangars, you will have a lot more work to do. But it will also generate significantly more revenue for the airport, which could lead to additional airport development projects being funded with existing airport revenue.

DESIGN ELEMENTS

- Underground drainage and storm water runoff control
- Underground utility layouts, fire protection sprinkler systems, electric, telephone, cable, sewer, gas piping, and tie-ins to existing systems
- Site grading, contour, excavation, and sub-base material plans
- Concrete hangar foundations
- Ramp, taxiway, and apron paving
- Architectural treatments and material specifications for hangars
- Structural design of hangars
(may be done by building supplier)
- Ramp and hangar lighting
- Landscaping
- Security fencing, gates, and personnel walk-through gates
- Parking lots as required and pedestrian walkways
- Not all of these elements will be necessary for all hangar development projects. The engineering contractor will be able to provide appropriate guidance for your project.

If you have already been working with an engineering consultant on the preliminary design steps of your project, you will need to finalize a contract for completing the design work. You will need input and assistance from the airport owner's legal staff or representative to prepare this contract because the decision makers in city hall will probably have to approve the contract.

Once the design contract is in place, get the engineering consultant started on the detail design. In some cases you might need to hire an architectural firm to complete some of the building designs. While the project designs are under way, begin to work through your review and approval plan. Many projects require multiple reviews throughout the process, so plan ahead. Depending on whether the project is private or public, the funding might need to be in place before beginning the detailed project design work. If not, the next task might be to obtain funding instead of beginning design work, you will need to determine what is appropriate in your case.

OBTAIN FUNDING

By now, you should have a good estimate of how long it will take to get the funding in place for construction to proceed. The engineering consultant will likely be familiar with the processes used by the FAA, state, county, or city when applying for grants or loans. The details of the funding process are outside the scope of this guide, but the basics have been identified, including the owner's staff responsibilities.

FAA AIP grants: There is a specific process to applying for an and receiving grant money from the FAA Aviation Trust Fund. Before the FAA will grant any money for an airport project, the grant-eligible aspects of a project must be included on the airport's annual airport capital improvement project (ACIP) list. The FAA also expects that the estimates used in the ACIP list for grant-eligible items will be accurate within 10 percent of the final cost, so allow for escalation of costs in these estimates. To obtain cost estimates, the design consultant will need to do some preliminary design engineering.

The FAA requires that the ACIP list be updated annually in early December for the following calendar year. This means that the hangar project must be on the airport's ACIP list the year before you would expect to receive funding. Don't forget to incorporate this reality into your project schedule. The FAA will only fund hangar development projects at eligible airports, provided that the airport certifies that all airside development projects in the ACIP have been planned for future implementation.

Public or Private Loans: Whether from private banks or state, county, or municipal sources, project loans can take a considerable length of time to become a reality. ("Project Planning – Step Three" should have given you an idea of what you'll be facing at this point in the project.)

Municipal (Government) Bonds: If your project funding plan includes publicly-or privately-issued bonds, remember that this too can be time consuming. The airport owner's

financial impact estimates for your project. If project costs have changed, you should be able to easily update your proforma to satisfy the needs of your funding sources. (See Appendix II.)

CONSTRUCTION PLANNING

With the hangar project design complete, funding in place, and approvals in hand, you're ready to prepare for construction. Some of the things you will need include a contracting plan, a performance based contract, bid packages, and bid review and approval.

Before you choose the construction company that's going to do the work, decide who will be your project manager for construction. In most cases, a city engineer or the design engineer will fill this role. The airport owner will likely want to retain this role through an existing engineering staff. However, he or she may charge a substantial fee for this. (Be mindful of the potential economic impact this could have on the project.)

he or she already has done the engineering and design work.

The project engineering consultant or staff should be able to create a contracting plan and construction schedule suited to your project. Often, all of the construction elements - underground utility and drainage, site grading, concrete foundations, building design and materials, building erection, electrical and area lighting, fencing, paving, and more - can be bid together with one contractor. Experience has shown that the fewer contracts the better as this forces the contractor to be responsible for the coordination and facilitation of all the interacting parts of the project. A contracting plan identifies which elements of the construction will be combined to increase efficiency. This method also reduces the workload on whoever will be coordinating the contractor(s) on site.

CONTRACT WORDING

Getting a competent lawyer involved in the contracting process is a must. It

“Experience has shown that the **fewer** contracts the **better** as this forces the contractor to be **responsible** for the coordination and facilitation of all the interacting parts of the project.

financial staff can be a valuable resource when preparing the details of a bond issue or sale.

You can likely use the financial projections you developed in Step Three when you did the preliminary

An efficient method would be to bid the entire construction project to one general contractor and pay the engineering consultant to act as construction manager and airport owner representative. The engineering consultant is ideal for the job because

is imperative that the contract address specific items related to the project before the bid process begins. Many items can be included in standard contract clauses by the airport owner, but make sure that the airport design and/or construction manager reviews

the contract for completeness prior to releasing the project for bids. Later, if you find yourself in a tough situation with the hired contractor, falling back on a complete and detailed contract will be invaluable. This guide provides a few suggestions that should be included, but tailor the contract to fit your project.

Schedule of Values: A schedule of values, or unit prices, is a required element of contracts for most publicly-owned airports and all airports using FAA funding. The FAA requires that all the books associated with the project be open. The contractor must provide a schedule of values so that the resident engineer (your project manager - the individual responsible for overseeing contractor performance) can approve contractor “progress payments.” Most construction contracts are based on a lump-sum bid, but contractors will expect to be compensated as the construction progresses. These progress payments must be based on actual construction progress. Contractors will occasionally submit a bill

for significantly more progress than has actually been completed. Without a schedule of values, you won’t be able to easily refute such claims.

For example, if a contractor bills the airport owner for 20 percent of the rough grading, the resident engineer must be able to verify that 20 percent has been completed. Payment will be based on 20 percent of the total cost of rough grading, usually measured in cubic yards. The schedule of values should provide the cost per cubic yard of this rough grading.

Without this schedule of values, the resident engineer will not be able to approve such billings for payment. Some contractors may be reluctant to provide such detail with their bid, but is required per FAA regulations.

Unknowns and Surprises: Unforeseen circumstances can arise during the construction phase of a project, whether unplanned by the contractor or unexpected by all parties involved. How such cases will be handled should be laid out in detail in the construction contract. For example, the contractor must immediately notify the resident engineer of a “surprise.” Then the resident engineer must review and evaluate the claim of a surprise and decide whether it would constitute an actual change. The resident engineer would negotiate the change based on a time and materials, unit price, or lump sum basis to complete the additional work. The time-and-materials approach must be detailed clearly in the contract wording, including an appropriate mark-up for profit. This approach should prevent a contractor from taking advantage of the surprise.

Notice of Potential Claim: This arises when the resident engineer says there is no change in the project but the contractor thinks there is. In such a case the claim for “extra work” would go to arbitration, where an impartial third party would decide whether the contractor’s claim has merit. Ensure that your contract covers such circumstances so the project can keep moving while the claim is in arbitration. The resident engineer tracks costs for the change, including time and materials. When the work is substantially complete, the final claim would go to the arbitrator who authorizes final payment.

Delays: During the course of construction, the contractor may notify the resident engineer of a delay. If this is caused by late material deliveries, confirm the delay with the supplier. Get the facts and assess the impact on the overall project schedule. There may be ways to adjust the schedule by rearranging various aspects of the project, such as inspections or approvals to keep it on target.

If there is no solution to staying on schedule, the resident engineer will need to estimate the additional cost to the client which, in this example is the airport owner. This includes liquidated damages, which usually includes the loss of potential revenue and additional overhead expenses. These must be quantified and how they are calculated must be available to the contractor. This information is used should the airport owner wish to file a claim against the contractor for the financial impact of the delay on the project. If the contractor is not at fault, it could be necessary for the contractor to pursue the supplier. The best protection is to have all such provisions for handling delays specifically explained in the contract.

Standard Retention: In most contracts, a percentage of the total contract price is withheld until the work is finished and the airport owner has accepted all work as complete and satisfactory. The standard retention amount is 10 percent of the total contract price, which is usually enough to cover the cost of completing the work in the event the contractor quits near the end of the project. (This also applies to claims of extra work.) The contract should be clear on this subject. Be sure there are provisions in the contract that spell out how and when the parties will go to an arbitrator if an agreement cannot be reached. It is unusual for a contractor to not finish its work, but the contract should make provisions for the possibility.

Progress Inspections: The resident engineer is usually responsible for monitoring daily progress. This is to be certain that progress billings from the contractor can be verified.

Specialty Inspections: These include architectural, construction, underground, plumbing, electrical, and other necessary

inspections. The resident engineer usually coordinates inspections that are required by the airport owner's building department and are all part of a final project inspection and acceptance of a completed project. Most building departments conduct inspections so as not to impede construction progress. The key to efficient use of project inspectors is for the resident engineer to

remain open, such as final landscaping. The benefit of a temporary occupancy permit is that it allows the revenue stream to start before the construction project is complete.

Notice of Completion: This is a formal notification of project closeout. It officially notifies anyone involved in the project that they have a period of time (normally 35 days)

“There may be ways to [adjust](#) the schedule by rearranging various aspects of the project, such as inspections or [approvals](#) to keep it on [target](#).”

coordinate schedules. Be sure to include the time required to schedule and conduct these inspections in your contract so the contractor is aware.

FAA Inspection: The FAA requires a final inspection (as well as some over the course of construction) to ensure that their requirements have been met. The FAA requires taxiway slope, fill material compaction, and concrete tests. The airport design consulting engineer should be aware of the detailed FAA requirements.

Punch List: The resident engineer and airport owner inspectors usually draw up a punch list of items that must be completed by the contractor before the construction can be considered complete or accepted by the airport owner. Items such as hangar door adjustment, touch up painting, and other minor items are often on a punch list.

Temporary Occupancy Permit: A temporary permit for occupancy may be issued by the airport owner to allow tenants to move into their new hangars should some remaining construction punch list items

to file any lien claims on the project. It also frees up the property for final occupancy. After the 35 days and all punch list items are complete the airport owner can release the 10 percent payment retention, less any uncompleted or disputed items. It is customary to retain up to twice the amount in dispute from the overall 10 percent. Be sure that your contract contains wording to cover your project in this area.

Construction Bonds: A bond protects the airport owner in case the contractor does not complete the project. If the contractor goes out of business or walks off the project, the bond works like an insurance policy, providing funds for the airport owner to complete the project. There should also be a 10 percent bid bond in place in case the awarded contractor refuses to enter into a contract. Once a contract is awarded, this bond is refunded to the contractor. If the contractor refuses to enter into a contract, he or she forfeits the bond. Make sure the contract includes specific details regarding the bonding requirements.



Step 4



Contractor Qualification: Some of the unique elements of an airport construction project require a contractor to be experienced in working on airports. An inexperienced construction contractor could make any number of mistakes, causing problems for the project. The contract should include wording that requires the contractor be qualified to work at an airport.

BIDDING

The engineering consultant will likely prepare the bid packages. The airport owner will have specific requirements for compiling a bid package. In addition to the detailed design drawings, the package will include material specifications, grading plans, utility connections to existing facilities, certificates of non-segregated facilities, bonding certificates, insurance documentation, how extra work claims will be handled, and other standard clauses as dictated by the airport owner. Include any FAA, state, or county requirements.

Pre-qualify potential bidders while the bid packages are being prepared. The airport owner's engineering staff or engineering consultant should know contractors who are capable of handling the project. It would be preferable that only contractors with prior airport construction experience bid on the project. However, this might not be practical in every case. The airport owner may have a specific process that he or she uses for bidding construction contracts and most often can handle this entire portion of the project.

Project Site Walk: Once the bid packages are released, the bidders will have a standard length of time to prepare their bids. Schedule a project site walk-through early in the bid period. The project manager (engineering consultant or airport owner representative) will schedule a time, usually included in the bid documents themselves, to have all interested bidders meet at the project site.

During the site walk, the bidders' representatives will have an opportunity to ask questions about the project. Pay particular attention to the subtle aspects of a project that may be obvious to you and the airport owner, because it might not be to the bidders. This includes utility tie-ins, special soil conditions, noise or curfew restrictions, impact of continuing airport operations during construction, and key owner contact during construction. The site walk will give you an idea of who is interested in bidding.

Bid Opening and Review: In the public arena, bid opening usually includes a public opening where the bid amounts and names of the contractors are announced. The packages are reviewed by the airport owner's engineering staff, your project manager or engineering consultant, who will want to read them anyway, to ensure that all elements of the construction project have been included in the bid.

LAST-MINUTE POTENTIAL PROBLEMS:

Problems can arise and even kill your hangar project. Here are a few examples of issues you may face.

- Uncooperative airport lease holder or property owners that change their minds regarding the use of their property for airport hangars
- Changes in key decision makers that include airport opponents
- Local community groups seeking to block the project, citing noise, traffic, and safety issues
- Unresolved issues from prior projects that were missed earlier
- Changes to rules and regulations impacting the operations of the airport
- Loss of funding

CONSTRUCTION CONTRACT AWARD

The airport owner should know how the construction contract award is to be handled. A senior member of the airport owner’s staff can handle this or it may require a vote of the city or county governing body to obligate the airport owner to the financial liability of administering a contract. If you are uncertain of the vote outcome, informally poll the group using the connections you have built up during the hangar project process. If further work is necessary to get the construction contract awarded it is best to know ahead of time and deal with these issues. Regardless, the final award of your construction contract should be quite simple at this point.

Negotiation and Value Engineering:

Depending on the scope of the hangar project, you might have the opportunity to reduce the cost of the project while the contract documents are being finalized. This is called value engineering. It is worth looking at value engineering because there could be significant

savings waiting to be uncovered. Value engineering could include the modification of architectural designs, substitution of building wall material, reuse of existing materials such as fencing, substitution of subgrade materials and fill requirements, and deferral of requested project elements by special interest groups. Meet with the construction contractor, project designer, and project manager (this may be the airport owner or engineering consultant representative) to review the project design details. Look for elements of the project that, with minor redesign or material substitutions, could save money. Keep in mind that you could run into “fair contract practice” issues with the other bidders if this discussion is held before contract award. So time this discussion accordingly. After the contract award, your construction contractor may not have much incentive to lower costs.

Once you’ve completed value engineering, you will have the lowest possible cost for the



project. If the contract has been awarded, any changes you make to the basic contract will most likely be included in a change order. Both the original contract and change order must be forwarded to the governing FAA ADO for their review and comment. This is required because you may have an FAA grant included in the project financing. The engineering design consultant can likely help you with this.

Pre-Construction Meeting: At the preconstruction meeting all the various parties meet to review, discuss, and agree on the project construction administration details, many of which are required by the FAA, and the airport engineering design consultant should be able to help plan and conduct this meeting.

MEETING AGENDA HANGAR CONSTRUCTION

There are two keys to a successful construction process. First is the mindset

that you and your team have when you interact with the contractor. It should be positive and business-like. This will set the tone for the remainder of the project. When a contractor knows that you will deal with him or her fairly and that you expect the same in return, you will have the best opportunity for a successful construction process.

The second is the efficient administration of the performance-based contract. This depends on the comprehensive nature of the contract and the willingness of the airport owner to hold everyone accountable to the requirements in this document. Work to ensure that construction will proceed with a minimum of problems, delays, and cost overruns. Of course you may not be able to avoid all potentially contentious situations with your construction contractor but you should be able to minimize their impact.

FINAL FAA CONSTRUCTION REPORT:

The FAA requires a final construction report (FCR). The airport engineering design and construction management firm, or airport owner representative who is familiar with the project, should prepare this report. The report should contain:

- Project narrative of the construction phase
- Documentation of any changes made during construction
- Data from quality assurance tests for concrete, asphalt, base rock, fill
- Tabulation of final costs, including quantities of materials used and an explanation of differences if the total cost to be covered by an FAA grant is off by more than 10 percent of the amount requested
- A final payment release request for grant funds (FAA withholds a final 10 percent until this report is received and accepted)
- An updated airport layout plan with the new hangars and other airport changes shown (include one for your state if they have invested money in the project, and particularly if there are major airport ramp and taxiway changes)

Final thoughts on hangar construction:

It is important that both the construction and the design engineering contractors have prior experience working on airport projects. Check and verify their references and experience claims. Airport owners sometimes have their public works in-house engineering staff do the design work. This is usually intended to save money but without prior airport design experience and familiarity with design standards they can cause significant problems.

Hangar buildings are not typical metal buildings. The specifications are unique and differ from the types of buildings the airport owner’s engineering staff might have designed. Also, the paving grade on airports is different from the grade on city streets.

Paving on city streets can be sloped for drainage with a 2-percent or higher grade. Aircraft owners would not be able to push their airplane up that slope into their hangar. Designing and adjusting hangar sliding doors is not like that of regular steel buildings. Doors must overlap without binding and move with a minimum of physical effort. The architect, building supplier, engineers, and inspectors must be familiar with these types of differences to avoid problems.

Private Hangar Developer: With private hangar development the developer will carry the responsibility of hangar construction. However, the FAA still needs to approve the designs and methods used on the project. The same contract wording applies to the lease agreement with a private developer. But there are some additional points to include in the contract. Be certain that the





developer is required to work closely with the engineering design consultant and resident engineer (or airport owner representative) because the FAA's design criteria applies to them too. Also include a performance clause that requires the developer to agree on a time period to start and complete the construction. To ensure that the developer cannot agree to build the hangars and tie up open airport property, and then fail to complete the project, require that airport land lease payments start only when all required parties have signed the lease agreement. Add specific wording to require the developer to meet all of the construction requirements of the airport owner and permit agencies.

NEW HANGAR MOVE-IN

The hard work of your hangar project is done and you are finally ready for tenants to move in. In most cases you will be moving in tenants who signed up on a waiting list for those hangars. It is critical to manage this process in a professional manner. Administer the list fairly and consistently. Again, don't allow back room deals.

Review your project cost economics to make sure the hangar rents will cover your costs. Also check that the airport owner's accounting department is ready to receive monthly payments from the tenants.

Notify the tenants on the list that they can move into the hangars. Remind them of the monthly rent and include any other fees that they will incur, like damage deposits, upon move-in. Have the rental or lease agreement ready for them to review and sign and obtain the appropriate insurance documentation from each tenant to protect the airport owner. After the tenants have moved in, check to ensure that any remaining punch list items are completed. This could include utilities, paint touch-ups, or door adjustments.

If you work through the waiting list and still have vacancies, consider advertising the new hangar availability. Posting advertisements and talking to nearby flying clubs, FBOs, and airport managers can be useful. If you have filled the new hangars and still have people on a waiting list, continue to manage it as you did during the move-in process.

Private Hangar Developer: You or an airport owner representative should have an agreement in place about how to coordinate tenant move-in with the private developer. You and the developer might have separate waiting lists if you have a combination of privately and airport owned hangars. If all of the hangars are privately developed, then the hangar owner usually manages move-in.

During move-in you should have an airport owner representative (usually the airport manager) available in case disagreements arise between the hangar developer and tenants on the waiting list. However, if the developer compiled and managed the waiting list, your capacity to resolve a disagreement will be limited.

Be certain that the developer does not allow renters to engage in activities that do not comply with airport zoning and building codes (i.e., running a business in a noncommercial zone or permitting non-aviation activity prohibited by airport operating standards).

“The hard work of your hangar project is done and you are finally ready for tenants to move in.”

CHECKLIST FOR STEP 4

- Obtain project design and funding
- Bid & award construction contract
- Construct hangars
- Complete hangar project and move in tenants

Step 5 : Project Evaluation

During the course of this project, you probably gained new insight into airport operation, development, and hangar construction. It is important that your team passes this real-world knowledge on to others who might pursue construction projects at your airport.

“Project Evaluation” focuses on capturing what was learned throughout the entire hangar project process. This will help ensure consistency in the operation of your airport and implementation of future airport development projects.

The two basic parts of project evaluation include checking to confirm your project economics are still valid and producing a record of the project. In Step Five, you will track the financial performance of the airport (including new hangar operation), adjust rental rates as appropriate, debrief project participants, conduct an airport tenant opinion survey, and present a final project report to the airport owner decision makers.

PROJECT ECONOMICS

When the income stream starts flowing from the new hangars, closely review the monthly revenue and expense reports produced by the airport owner. Check your original estimates (produced during the first three steps of the guide) and confirm that the hangars are generating sufficient revenue to cover all of your expenses, including any new principle and interest payments. Don’t forget to include additional fuel sales revenue in the review.

Ideally, you should be generating sufficient revenue to cover all operating expenses and financing costs, with enough to set some aside in a reserve fund. If the project is generating excess revenue, evaluate the reserve fund needs and adjust as appropriate.

If insufficient revenue is being generated, it may be necessary to increase the rental rates to cover the shortfall. Your standard rental/lease agreement may limit rent increases,

so take this into account when evaluating financial performance. It may take a few months to get a good handle on the situation, but start tracking the airport finances early and often. Appendix I, “Airport Revenue and Expense Financial Analysis,” can be used to check the airport’s new financial state.

At a federally funded airport, the FAA requires that airports charge fair market rental rates. The FAA also frowns upon charging rates that exceed fair market value and the agency could view such an act as unjust economic discrimination. For any consideration of adjustments in hangar rental rates it is extremely important to involve stakeholders early in the discussions.

DEBRIEF PROJECT PARTICIPANTS

An effective method for evaluating the project is to go back to your stakeholder analysis and conduct interviews with these individuals again. Now that the project is complete, ask for their thoughts and suggestions about how to improve the process. Discuss the project approval process, the impact on schedule and cost, the impact on current airport businesses, tenants, and staff, and the level of satisfaction from key decision makers. You should also obtain input and reactions from the airport design engineering consultant, airport owner engineering staff, construction contractor, resident engineer, and airport owner representative.

CONDUCT AIRPORT TENANT OPINION SURVEY

Many airport tenants (business owners and users) initially might not be included in the stakeholder debriefing, but their input is

no less important. To find out, email them a short opinion survey, limited to 10 or fewer questions and use a simple scale (e.g., rank the level of satisfaction from 1-10).

Tabulate the numerical results and consolidate the written comments. Then combine your stakeholder and tenant survey results to create a brief report for your key decision makers and airport tenants. (A Microsoft PowerPoint presentation is a simple and effective reporting method.) Because your decision makers and tenants took time to be interviewed or to complete an opinion survey, you owe them an opportunity to see the results. An airport users' meeting can be an effective venue for such a presentation. Sharing the results with the stakeholders and tenants fosters open communication and relationship building.

Provide copies of the final project report to the group responsible for airport management oversight, whether it is an individual, airport committee, or local government commission. They should have copies available for whomever is involved in the next airport development project. Your report and shared experiences should enable the next project team to complete their project more efficiently.

The project process in this guide has been tried and proven to work. It will provide you with many useful ideas, tools, and approaches to embarking on a hangar project at any GA airport.

SAMPLE OPINION SURVEY QUESTIONS

DID THE CONSTRUCTION PHASE OF THE PROJECT IMPACT YOUR USE OF THE AIRPORT?

(1-10 scale, 1 being strongly disagree, 10 being strongly agree)

HOW DID THE PROJECT IMPACT YOUR USE OF THE AIRPORT?

(Ask for a written response or provide a list of examples with boxes to check.)

THIS HANGAR PROJECT WILL BENEFIT THE AIRPORT.

(1-10 scale)
Explain why or why not.

WAITING LIST WAS WELL ADMINISTERED.

(1-10 scale)
Explain why or why not and provide some suggestions for future projects.

TENANT COMMUNICATION WAS SUFFICIENT.

(1-10 scale)
Explain why or why not.

OVERALL, HOW WOULD YOU RATE THIS PROJECT?

(1-10 scale)
Explain why.

WHAT ELSE WOULD YOU LIKE TO SEE DEVELOPED?

CHECKLIST FOR STEP 2

- Track financial performance of airport, including new hangar operation
- Adjust rental rates as appropriate
- Debrief project participants
- Conduct airport tenant opinion survey
- Provide final project report to airport owner decision makers

Appendix I AIRPORT REVENUE & EXPENSE FINANCIAL ANALYSIS

Financial analysis is nothing more than a review of the airport's revenues and expenses—think of it as balancing the airport's checkbook. Most of the information can be obtained from the airport owner's finance department.

Whether a private developer or the airport owner builds and operates the hangars, most of these financial elements will apply to the typical GA airport. These are some of the principal elements that make up the airport's revenues, expenses, and other financial items:

REVENUE

- Fuel sales: revenue from 100LL, Jet A, auto, oil, etc.
- Hangar rent: revenue from owner operated/built hangars
- Tiedown rent: revenue from tiedowns, including transients
- Ground rent/land leases: revenue from airport land leases for FBOs, charter operators, private hangar development, etc.
- Interest earnings: revenue from bonds and bank accounts
- Miscellaneous revenue: property tax returned to airport, penalty payments, etc.

EXPENSE

- Salaries and benefits for full- and part-time employees
- Fuel purchases: wholesale purchases of fuel for sale (applies to airport owner operated fuel system)
- Fuel flowage fees: cents per gallon of fuel sold payable to airport owner (privately owned and operated fuel system or large operator has its own fuel supply)
- Professional and contract services: standing engineering consultant fees, contract employee fees, and other consultants
- Utilities: payments for electric, water, sewer, heating
- Bank fees and lab services: bank fees for credit card purchases, ground water/runoff testing for environmental compliance, underground fuel system tests

- Telecommunications: telephone, computer services, etc.
- Office supplies: postage, paper, pencils, computer, interior areas and other supplies
- Repair supplies: parts to maintain airport vehicles, hangars, fuel system, etc.
- Repairs and maintenance: services for equipment repair, hangar maintenance, fuel system repairs, etc.
- Miscellaneous: travel, memberships, advertising
- Overhead allocations: secretarial staff, finance staff, management. This can be allocated based on a standardized method used for charging other departments of owner operations, or it can be direct actual costs. The FAA requires whatever method used be consistent for all departments and enterprise funds.
- Insurance: general liability and damage coverage
- Taxes: local, county, state
- Bad debt write-offs

OTHER ITEMS

- Loan payments: principle and interest
- Federal grants received
- State grants received
- Capital project expenses
- Fixed-asset depreciation

Use the financial analysis to build your credibility as a knowledgeable airport proponent. In a situation where there has

been little analysis, this information also will help influence key stakeholders to support the project. If the airport's financial situation is not currently satisfactory, rectify it before

proceeding with the hangar project. By tabulating the airport's annual financial results and tracking its current fiscal year performance quarterly or monthly, you will learn quickly about its financial health. The financial institutions that will be

SAMPLE AIRPORT OPERATING AND EXPENSE SUMMARY

REVENUE	BUDGET	ACTUAL	1QR	2QR	3QR	4QR
Fuel sales	460,000	480,000	110,000	130,000	140,000	100,000
Hangar rent	420,000	450,000	105,000	105,000	120,000	120,000
Tiedown rent	15,000	17,800	4,400	4,400	4,500	4,500
Ground rent	90,000	93,000	22,500	22,500	24,000	24,000
Interest earnings	46,000	48,000	12,000	12,000	12,000	12,000
Property tax return	48,000	45,000	0	0	45,000	0
Miscellaneous	12,000	11,500	4,000	2,500	3,000	2,000
TOTAL	1,091,000	1,145,300	257,901	276,402	348,503	262,504
EXPENSES	BUDGET	ACTUAL	1QR	2QR	3QR	4QR
Salaries, benefits	32,000	32,000	8,000	8,000	8,000	8,000
Fuel purchases	360,000	370,000	90,000	80,000	100,000	100,000
Contract services	82,000	90,000	20,000	30,000	20,000	20,000
Utilities	55,000	56,500	14,000	14,000	15,000	13,500
Bank/lab fees	12,000	12,500	3,000	3,200	3,500	2,800
Telecommunications	2,500	2,500	600	600	700	600
Office supplies	2,500	2,700	600	600	800	700
Repair: parts	15,000	20,500	5,000	3,000	6,000	6,500
Repair: maintenance	20,000	24,000	6,000	4,000	7,000	7,000
Miscellaneous	9,500	10,500	3,000	2,500	2,000	3,000
Overhead	85,000	86,000	21,500	21,500	21,500	21,500
Insurance	6,000	6,000	1,500	1,500	1,500	1,500
Taxes	4,000	4,000	1,000	1,000	1,000	1,000
Bad debt	1,500	1,300	500	300	400	100
TOTAL	702,000	718,500	174,701	170,202	187,403	186,204
OTHER	BUDGET	ACTUAL	1QR	2QR	3QR	4QR
Loan: principle	(82,000)	(82,000)	0	(41,000)	0	(41,000)
Loan: interest	(355,000)	(355,000)	0	(178,000)	0	(177,000)
Federal grants	150,000	150,000	0	150,000	0	0
State grants	0	0	0	0	0	0
Capital project expenses	(160,000)	(181,000)	0	(169,000)	(12,000)	0
Depreciation	(85,000)	(85,000)	0	0	0	(85,000)
TOTAL	(450,000)	(471,000)	0	(169,000)	(12,000)	(262,000)

SUMMARY

	BUDGET	ACTUAL
Revenue:	1,091,000	1,145,300
Expenses:	702,000	733,500
Other:	(450,000)	(471,000)
TOTAL	(61,000)	(59,200)

In this example, there is a budgeted loss of \$61,000, compared to an accumulated year-end loss of \$59,200. Since this loss can be attributed to depreciation charges, \$85,000, (see comments about depreciation in "Project Planning – Step One"), there is actually a small surplus when depreciation is excluded from the review.

Appendix 2

HANGAR PROJECT PROFORMA

The financial project *proforma* is a detailed projection of the impact of your hangar project on the financial health of the airport. To create this *proforma*, take the year-by-year financial review as outlined in Appendix I and make some assumptions based on the scope of your hangar project.

providing the money for your project will probably want to see the analysis. The airport owner's financial staff might be able and willing to do this for you; if not, it is not difficult. Remember, it will demonstrate the true value of your project to the airport over time. This proforma will be useful when influencing the key decision makers and stakeholders to support the project. If you can prove that your hangar project could make the airport self-supporting (without the need for supplemental funds from the local tax base), you'll find them much more supportive.

The first task is to complete the annual financial analysis in Appendix I. Then list the project scope assumptions. Identify the scope items in the project that will impact the airport's revenue, expenses, and loan payments after the hangars are complete and generating revenue. Take a look at these assumptions for the example airport financial analysis used in Appendix I.

- Current airport hangar space rented: 124,000 square feet
- New hangar space for rent: 30,000 square feet (30 new hangars, 24 percent increase in rentable hangar space). Estimate the cost of the hangar project and use a loan calculator to estimate the interest and principle payments. The design engineering consultant should be able to create a project cost estimate
- Utilities increase with the increase in hangars (24 percent)
- Increase the current rental rate of \$0.27 per square feet per month as appropriate (assume 3 percent annual inflation)

- Additional fuel sales: There are currently 200 aircraft, and you will be adding 30 new hangars. Assume that 50 percent of the hangar occupants are new to the airport (i.e. 15 new aircraft). This means a 7.5 percent increase in aircraft based at the airport $[(200+15)/200 = 1.075 \text{ or } 7.5\%]$. Therefore, fuel sales also should increase 7.5 percent. The rest of the hangars would be occupied by current tiedown renters $(\$480,000+7.5\% = \$516,000)$
- Current hangar rent: $\$450,000 (124,000 \text{ square feet}) + \$99,000 \text{ for the new hangars } (30,000 \text{ square feet} \times \$0.275/\text{mo}) = \$549,000$
- Increase operating expenses 3 percent per year for inflation
- Increase fuel purchases 7.5 percent
- Increase miscellaneous revenues and expenses by 7.5 percent related to aircraft on field

Now that the assumptions are in place, set up the projections. Consolidate some of the revenue and expense numbers such as those that are not impacted by the increase in aircraft based on the field. Exclude grants, depreciation, and capital project expenses because you want to project only the ongoing operating revenues and expenses to see if you can afford the hangar project.

The yearly projected total is the total revenue minus the expenses and loan payments. "Year 0" is the current financial state of the airport. "Year 1" assumes the hangar project is complete and generating revenue. This airport example would include the 7.5 percent increase in fuel sales and purchases and 3 percent inflation increases in rental

rates (3 percent inflation for following years as well). You could do these projections without considering inflation, or you could use a figure other than 3 percent, but don't forget the impact of rent increases on revenue. You can continue the projections through to the end of the loan term, but only the first 10 years are shown in this example. The numbers on the chart below have been rounded to thousands of dollars.)

After the project is complete and begins to generate revenue and attract new aircraft

to your airport, which will increase fuel sales, the net end-of-year financial picture starts to improve. Inflation will continue to drive up costs and expenses, but your financing cost is constant, so you'll see an improvement in your airport financial picture.

If the airport does not own the major sources of revenue, like the fuel system and hangars, the viability of your hangar project could be significantly affected. This is why a careful review of the airport's financial situation is vital. Working all of these issues into your business plan is critical if you are going to build the support needed to execute your project effectively

REVENUE	YR 0	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6	YR 7	YR 8	YR 9	YR 10
Fuel	480	530	547	563	580	597	615	634	653	672	691
Hangar rent	450	549	565	582	600	618	636	655	675	695	715
Other rent	110	113	116	119	122	126	130	134	138	142	146
Property tax	45	50	51	53	54	56	58	59	61	63	65
Other	60	62	64	66	68	70	72	74	76	79	82
SUBTOTAL	1145	1329	1345	1386	1428	1472	1517	1563	1611	1660	1709
EXPENSES	YR 0	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6	YR 7	YR 8	YR 9	YR 10
Salaries/benefits	32	33	34	35	36	37	38	39	40	42	43
Fuel purchase	370	398	409	422	435	447	461	475	489	504	519
Utilities	57	71	73	75	78	80	82	85	87	90	93
Other exp	162	167	172	177	182	188	193	199	205	211	217
Overhead	86	89	91	94	97	100	103	106	109	113	117
Other exp	11	11	12	12	12	13	13	14	14	15	16
SUBTOTAL	718	769	791	805	840	865	890	918	944	965	1005
OTHER	YR 0	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6	YR 7	YR 8	YR 9	YR 10
Loan principle	82	84	86	88	90	92	94	96	98	100	102
Loan interest	355	353	351	349	347	345	343	341	339	337	335
New loan principle	20	21	22	23	24	25	26	27	28	29	
New loan interest	86	85	84	83	82	81	80	79	78	77	
SUBTOTAL	437	543	543	543	543	543	543	543	543	543	543
TOTAL	(10)	17	11	38	45	64	84	102	124	152	161

Appendix 3 IS YOUR BUSINESS CASE COMPELLING

For your project to be successful it must be compelling to the key decision makers and stakeholders. There are four key phases to create and integrate a compelling business case for your hangar project.

- Phase One:** Develop the Business Case
- Phase Two:** Review with Stakeholder
Ensure the Business Case is Compelling
- Phase Three:** Develop a Basic Presentation
- Phase Four:** Feed the Business Case into Your Communications Plan

Depending on the requirements of your project and the demands of decision makers and key stakeholders, you might not need to go through all of this detail. However, it is still beneficial as it ensures the project will be successful even when faced with resistance.

PHASE ONE: DEVELOP THE BUSINESS CASE

Review the questions listed in Phase One and brainstorm other questions that will capture the five aspects of a compelling business case. It is important to document the business case, even parts that seem obvious, because it gives everyone the same point of reference for communication.

PARTS OF A COMPELLING BUSINESS CASE	QUESTIONS TO ASK TO DEVELOP EACH PART OF THE BUSINESS CASE
<p>PART 1: Description of the project</p>	<ul style="list-style-type: none"> • What is the current situation? Describe what will be targeted in the project. • What is currently going well that can be built on? • What has been done to confirm the need for new hangars? • Who authorized/initiated the project?
<p>PART 2: Description of the project importance</p>	<ul style="list-style-type: none"> • Why are the hangars needed? • What is the motivation of airport users for new hangars? Do they perceive: <ul style="list-style-type: none"> - An opportunity – a situation leading to future success? - A need – a current shortage of hangar space? - A discomfort – an existing problem requiring a solution? - Pain – a severe problem requiring immediate response? • What situation demonstrated the current need?
<p>PART 3: Description of benefits of the new hangars</p>	<ul style="list-style-type: none"> • How will stakeholders benefit in the short run? • How will stakeholders benefit in the long run? • How will the airport, local community and owner benefit in the short/long run? • What are the consequences of not doing the project? • What resources will be available to complete the project?
<p>PART 4: Description of the costs associated with the project</p>	<ul style="list-style-type: none"> • What will it cost in terms of money, time, and effort? • How will stakeholders be impacted by these costs? • What is the cost/benefit analysis (project proforma)?
<p>PART 5: Measures for success</p>	<ul style="list-style-type: none"> • How will success be measured? What is the monitoring system? • What does success look like? • How will stakeholders recognize success?

PHASE TWO: CHECK WITH STAKEHOLDERS TO ENSURE BUSINESS CASE IS COMPELLING

In Phase Two, evaluate how compelling the business case is to key stakeholders. Review these questions, and check your business case against them.

THE STAKEHOLDER WILL ASK:	THE STAKEHOLDER REALLY WANTS TO KNOW:
<p>PART 1: What does the project look like?</p>	<ul style="list-style-type: none"> • Is the project going to impact my business or daily work?
<p>PART 2: Why is this project important?</p>	<ul style="list-style-type: none"> • What's in it for me? • Who cares? • So what? • Is it going to negatively impact me?
<p>PART 3: Is it good for business?</p>	<ul style="list-style-type: none"> • How will the project help my business? • How will the project make my job easier/harder? • How will the project make me look good/bad?
<p>PART 4: What will this cost me?</p>	<ul style="list-style-type: none"> • How will the project impact my budget, people, and time? • What do I have to give up if the project goes forward? • What additional workload will I have?
<p>PART 5: When will this be successful?</p>	<ul style="list-style-type: none"> • How do I know I'm done with this and can go back to my "real work?" • How will I know there is a positive impact on my business?

PHASE THREE: DEVELOP A BASIC PRESENTATION

Once the business case has been drafted into your plan and checked with a sample of stakeholders, develop a presentation that can be used for communication about the project. Microsoft PowerPoint can be a helpful tool to organize and deliver your presentation. Adjust the format to match the audience to which you are speaking.

PHASE FOUR: FEED THE BUSINESS CASE INTO YOUR COMMUNICATION PLAN

Be sure that the communication plan you have developed to gain the support of key stakeholders includes a discussion of the business case. Keep in mind that the business case will change as the project progresses. Revisit the business case frequently as conditions and situations change, such as project cost increases.