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SOURCES FOR SPACE TECHNOLOGIES: FINDING AND EVALUATING NEW PARTNERS

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ABSTRACT

Successful technology infusion requires (1) finding a match between an organization's needs and technologies and those of an external partner and (2) helping both parties realize that they have something to gain from working collaboratively. After assessing whether the specific technical need is fully understood and confirming that pursuing partnerships to fulfill that need is indeed a worthy venture (i.e., a "need assessment"), one begins a Strategize-Seek-Secure process. The Strategize phase includes using appropriate parameters and sources to search for all organizations that might be potential partners and then down-selecting the results to only those that are truly relevant. These remaining organizations are then ranked A, B, or C, and a strategy is devised for approaching each level as well as each individual organization. During the Seek phase, appropriate communication materials are developed and used to contact potential partners. Using the information gleaned from these interviews, one then evaluates the organizations, re-ranking them as needed. The Secure phase involves facilitating meetings and conducting negotiations between the potential partner(s) and the internal "Need Owner" who will participate in any agreement for collaborative research and development (R&D). This entire process is part of the "6-S for Partnership Development Success" methodology.

As discussed in the 2005 International Astronautical Congress paper entitled "Investigate before Investing: Using Technology Transfer Principles to Guide R&D," strategic R&D investments require looking outside one's own organization to determine whether a technology or capability already exists that could enable or accelerate the R&D effort. Doing so avoids "reinventing the wheel" and allows for others' investments to be leveraged for one's own organization's benefit. Therefore, aerospace organizations—be they industry, governmental, or academic—can be well-served by forming partnerships for "technology infusion" and/or collaborative R&D.

Successful technology infusion requires (1) finding a match between an organization's needs and technologies and those of an external partner and (2) helping both parties realize that they have something to gain from working collaboratively. This paper provides step-by-step guidance for

fulfilling these requirements—that is, finding potential R&D partners and evaluating whether a partnership will indeed be a win-win situation for both parties.

1. BEFORE YOU BEGIN: SCREEN THE NEED

Before the process of searching for potential partners can begin, it is essential that the specific technical need is fully understood and that preliminary research confirms that pursuing partnerships to fulfill that need is indeed a worthy venture likely to lead to success. To skip this first step risks wasting resources in pursuing partners that do not exist.

1.1 6-S: A Foundation for Success

This notion of "confirming" an effort before proceeding is part of a larger methodology for ensuring technology transfer success. As depicted in Figure 1, each phase of the "6-S for Partnership Development Success" methodology includes a Confirm step, during which the decision is made

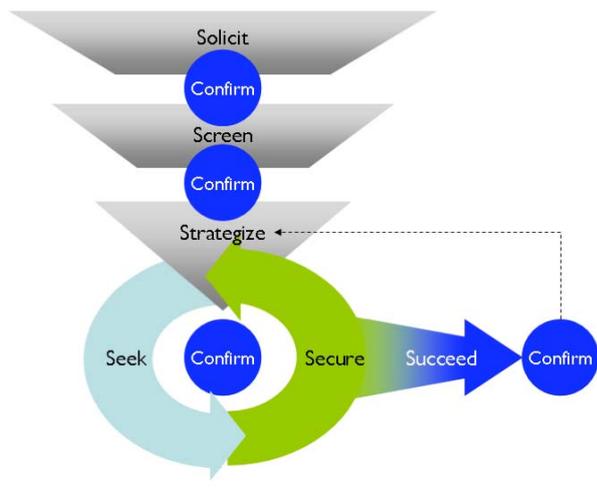


Fig. 1: 6-S for Partnership Development Success.

This proactive, efficient, effective approach maximizes the value of successful efforts while minimizing resources spent on low-potential opportunities.

as to whether to proceed to the next phase. This Confirm step provides validation, ensuring that a project is still on the right path toward the expected “return on investment” while watching for unexpected obstacles that might arise.

The 6-S approach for partnership development can be summarized as follows:

- **Solicit** technology needs from the organization’s program managers, division chiefs, and other appropriate “Need Owners” among research staff. **Rationale:** An understanding of exactly what is needed (including detailed specifications) ensures that partners with the appropriate capabilities and/or technologies can be identified.
- **Screen** the needs to identify those with the best potential for successful partnerships, identifying the types of organizations most likely to have an interest in partnering for joint R&D to address the need. **Rationale:** Since not all needs will require or benefit from partnering, one must assess the need to determine that further investment in partnership development is warranted.
- **Strategize** the approach for seeking and securing a partner to help address the need, keeping in mind any technologies or other intellectual property (IP) that might serve as an incentive for a potential partner. **Rationale:** Industries with technologies relevant to an organization’s need also might benefit from its existing IP; therefore, infusion-based partnership development strategies often involve an element of “technology diffusion” or “spin-off.”

- **Seek** out specific potential partners in government, academia, and industry and determine their interest in and capabilities for partnering. **Rationale:** If a potential partner is not sufficiently qualified, then any further efforts to develop that specific partnership would be a waste of resources.
- **Secure** a partnership by developing and negotiating a win-win agreement with the best (not simply any) partner(s). **Rationale:** An agreement cannot be successfully forged if it is not mutually beneficial, maximizing the value for all partners.
- **Succeed** in maximizing the value of the partnership by monitoring and promoting it. **Rationale:** Monitoring an agreement confirms that all parties are benefiting from the partnership while eliminating any obstacles before they become insurmountable. Promoting the success of a partnership builds the organization’s credibility as an R&D partner, favorably contributing to future partnership development efforts.

Note: Validation/Confirmation during the Seek and Secure phases might indicate a need to re-Strategize, hence the iterative cycle in the flow chart.

An overview of the need assessment is provided below to “set the stage” for the Strategize, Seek, and Secure phases discussed in detail in Sections 2–4.

1.2 An Introduction to Need Assessments

A need assessment is to technology infusion what a technology assessment is to technology spin-out, spin-off, out-licensing, or any other activity related to IP management. That is, a need assessment determines whether (1) a specific need **could** be addressed by an external partner and (2) whether it is cost-effective or otherwise logical to pursue agreements with potential partners. The need assessment indicates whether a partnership agreement is the appropriate vehicle for accelerating R&D. This is analogous to the research needed to make a preliminary make-buy decision.

In considering the value of the need assessment, one must remember that not all needs will require or benefit from partnering. Some R&D needs might be better addressed by other means. For example, if a specific need is closely matched with an existing external technology and could be easily incorporated without extensive R&D being required, then a standard procurement contract or acquisition strategy is more appropriate than a partnership agreement.

Another case where partnering might not be appropriate is when working with an outside collaborator will not sufficiently accelerate the readiness level of the technology. For example:

- Your organization may have more advanced and rigorous requirements than any other organization and you are the only one that will benefit from solving the issue. For example, out-gassing of adhesive materials used in space telescopes does not occur on Earth and is therefore not a typical material characteristic required by the optics industry.
- The technology need is an evolutionary step from an existing product in your organization's core competencies and no external partner could speed up the R&D process.
- The schedule for resolving the need is shorter than the typical product development cycle in which the potential solution exists. In these cases, it is preferable to make the extra investment needed to "go it alone" and get a product out quickly (maximizing the value out of the market) than to take the time needed to find partners and risk losing a market opportunity.

In cases such as these, any attempts to find an appropriate partner will either be wasted effort or (even worse) would result in a partnership that does not achieve the desired advancements.

In order to separate those needs that would be better served through other means from those where partners should be pursued, the analyst leading the need assessment begins by interviewing the Need Owner to fully understand the R&D challenge, the options that have already been explored but failed, and the exact specifications needed for a solution as well as to inquire about organizations that should be considered as potential partners. After this interview, the assessor gathers market intelligence from a variety of secondary (i.e., literature searches) and primary (i.e., expert interviews) sources. An overview of secondary and primary research was provided in the 2005 "Investigate before Investing" IAC paper, and details and examples are provided in Sections 2.0 and 3.0 below.

As data are gathered for the need assessment, they are analyzed to fully understand the current status and future direction of markets in which relevant technology developments are occurring. These markets are initially identified through team "brainstorming" (as described later in this paper), but are then greatly expanded by interviews with five or more experts.

A tool that can be used to understand the technology "landscape" in the markets these experts identify is commercially available patent mapping systems, such as Aureka®. These systems provide citation diagramming to identify the proximity of other organizations' innovations to the specific need to be fulfilled. Although the information provided by such systems can be useful in identifying potential partners (assignees) and foundations for a solution (patents), they are merely a single tool to augment the analysis and should not be considered as the single source of "The Answer" to the question of whether or not partnership development should be pursued.

The analysis also results in an understanding of each relevant industry's structure (including key players) and the trends that will influence the technology landscape. Future trends are an important indicator of whether the potential for success is sufficient to justify further Strategize-Seek-Secure partnership efforts. An example of such a trend would be the encoder industry's tendency toward faster movement within a given resolution but the internal need is for higher resolution and speed is not important (i.e., a mismatch of focus). As another example, if industry sees greater economic value in a disposable part but your need is for greater reliability and durability—and hence completely different materials will be required—then efforts to develop a partnership might not be successful.

In summary, the need assessment represents a required element for proactive, efficient, and effective partnership development efforts. It helps determine how—or even whether—partnership development resources should be invested. In addition, an effective need assessment provides a starting point for identifying those organizations most likely to be interested in participating in a partnership, enhancing the efficiency of the Strategize-Seek-Secure process.

2. STRATEGIZE

This phase involves following up on the research conducted during the need assessment to identify all of the corporate, academic, and government organizations that might be appropriate partners to address the R&D need and developing an effective strategy for approaching them with the partnership opportunity.

2.1 Identify Appropriate Search Parameters

In considering the process of finding appropriate partners for a technology infusion project or other collaborative R&D, it is assumed that a need assessment has already been conducted (see

Section 1.2). The Strategize phase begins by developing search criteria for expanding upon the need assessment's preliminary list of potential industry, academic, and government partners within the relevant markets. Depending on the capabilities of the staff, the strategy and search criteria may be best developed using group-oriented activities such as "brainstorming," where technology- and business-savvy analysts with relevant yet varied backgrounds identify the best keywords, the fields across which they should be applied, and the best information sources to mine during the search. If such an approach was followed during the need assessment, then the need for brainstorming during this phase is reduced.

Success in part is predicated on the fact that only the perfect set or string of keywords will yield germane results. As an example, let us assume that the need in question is related to small, lightweight, self-contained, inexpensive (e.g., disposable), real-time, *in situ* sensors to monitor atmospheric characteristics and transmit the data directly or via satellite link. The use of multiple, remote, and distributed sensors that must transmit data without wires clearly signals that a solution will require expertise in wireless sensor networks (WSNs). Therefore, appropriate keyword terms will include those related to WSNs (e.g., smart dust) as well as individual sensor types (e.g., temperature) and data-handling technologies (e.g., telemetry).

Although search terms that focus on the purpose of these sensors, such as "meteorological instrumentation" or "environmental monitoring," might identify organizations that have some probability of being capable of meeting the need, these types of "solution-oriented" terms must be used carefully. Such terms will generate organizations that might be promising partners, yet some of the organizations will actually specialize in, for example, large-scale solutions that are unlikely to be portable and certainly are not disposable. In fact, because they are already in the industry and therefore may be competitors of organizations that would be ideal potential partners, representatives of these organizations will not suggest revolutionary approaches to solving the need. It will be important to carefully down-select the results to ensure the list of potential partners is sufficiently targeted to be cost-effective (see Section 2.3).

It is important when identifying search keywords for infusion projects is to consider the possible "spin-off" applications for the technology that will result from the collaborative R&D. Organizations that could use the resulting technology might be already trying to address their need for it

themselves. Even for organizations that have not begun such research themselves, if the technology that would result from a partnership will address a need they face (even if they had not previously recognized it as a problem to be solved), these organizations are more likely to have interest in partnering and accelerating achievement of a solution. Such a focus on "spin-off" applications is particularly important when the organizations that might be potential partners are not typically affiliated with the aerospace industry—the so-called "unusual suspects."

2.2 Conduct the Search

No single database or type of resource can be considered the sole means for identifying potential partners for a collaborative R&D effort. The keywords identified as described above should be used to guide research with all of the sources discussed below.

Need Owner and Expert Referrals: As stated in Section 1.2, the Need Owner interview conducted during the need assessment is likely to generate at least some suggestions for potential partners. Because most Need Owners are monitoring relevant advances in their field, they will have insights into companies, universities, or government labs where innovative research is occurring. They also might have informal relationships already established at such organizations from having attended conferences. Conversely, they might have insights on organizations where collaboration is unlikely to be successful or would not be appropriate. Given that the Need Owner will be a key player in a resulting partnership, such suggestions and preferences should be taken into consideration. Nevertheless, the insights of these researchers most likely will be limited to the more "obvious" potential partners and exclude organizations that might be working in an orthogonal field. For example, engineers designing moon-based robotic manipulators may not consider Earth-based excavation equipment manufacturers as potential partners, yet these organizations have relevant expertise in autonomous systems operating in harsh environments. The broader insights are likely to come from the experts interviewed during the need assessment.

Internal Team Brainstorming: As was the case in identifying keywords, a short meeting (either in-person or teleconference) with appropriately educated and experienced individuals might result in the identification of specific companies to include on the list or types of organizations to search for in online and other electronic databases (see below). These individuals should have not only the technical background required to understand the organization's need but also the

business experience necessary to understand the market's interest in collaborative R&D in this area and the non-aerospace applications for the resulting technology. Of course, as indicated earlier, such brainstorming would have been performed as part of the need assessment to guide secondary research. However, the analyst might learn of previously unidentified innovative solutions, particularly during the need assessment's expert interviews. In these cases, the list of relevant markets in which potential partners might be found should be revisited and expanded.

Electronic Searches: In addition to the Internet searches facilitated by search engines such as Google™, a variety of other electronic databases and online sources can be used. For example, industry conference Web sites might list presenters, exhibitors, and attendees or the sponsoring association's membership list. Fee-based databases such as Dialog or OneSource can be a valuable resource for identifying potential partners. Market research firms such as Frost & Sullivan and MindBranch® have lists of companies and other organizations within a particular research area.

It should be noted that the online searches can be conducted by personnel with basic research skills, but these individuals do not require technical expertise. Because technology- and business-savvy analysts identified the keywords, an individual with a specialized skill set (e.g., a librarian or information researcher) can capture the information for their review. To facilitate the review of the full list, the data should be captured in a spreadsheet or other database mechanism. The relevant data fields to be captured for each organization include the following:

- The name of the organization
- A description of its business activities
- Its location and phone number(s)
- Indications of its size such as annual sales and/or number of employees
- Its code from the North American Industry Classification System (NAICS)
- Its Web site address
- Names and contact information (if available) of executives

If there are other facts related to the organization's relevance or ability to partner for collaborative R&D, those should be captured as well. Such facts might include Web links to details of relevant technology, lists of related patents with

key inventors, articles about recent activities, and conferences at which it participated.

2.3 Down-Select and Rank Results

Most times, the search process described above will yield a large number of organizations. Yet not every identified organization should be included in the Seek phase. As discussed above, the keywords—particularly those that are solution-focused—might yield organizations that are not appropriate potential partners. Therefore, an analyst should review each organization's business descriptions to "down-select" for those that truly are relevant. In the sensor example presented above, the analyst likely would eliminate organizations whose technologies are not portable or self-powered.

For the remaining relevant organizations, the analyst ranks each as level A, B, or C. A-level partners are the key leaders in the field that have the most to offer as a partner and with whom collaboration is ideal. In the case of the sensor example above, such companies might include small businesses with smart dust research efforts and recent rounds of venture capital (VC) funding. B-level partners might have less to offer than those on the A level, but they still are good potential partners. C-level partners usually have some overlap in capabilities but may not be on the cutting edge. In some cases, C-level partners have other issues that make them less-than-ideal partners. In the sensor example, a C-level partner might be a large business that provides meteorological systems but is not conducting innovative research.

It should be noted that, although details about a company's size and current market share are captured during the search process (Section 2.2), such data are not necessarily good indicators of a successful partner. Small companies tend to be more innovative and less risk-averse than larger organizations. In some cases, particularly with a large government organization such as NASA in the U.S. or the European Space Agency, small companies might be eager to form a partnership, viewing it as an entree for later R&D and procurement contracts. On the other hand, large businesses may be more financially stable and have greater resources available to devote to the partnership.

2.4 Strategize Approach

The A-B-C ranking of potential partners is a key element in developing an efficient, effective strategy for the Seek phase. The full strategy will outline how and when to contact each level of potential partner.

For example, A-level partners should not necessarily be contacted first. Initiating the Seek process by first contacting some C-level partners provides the opportunity to “iron out the wrinkles” that could be detrimental to interactions with A-level partners. For example, interactions with C-level players can help to identify industry-requirement details that potential partners will need before they can comment on their partnering interest. Approaching A-level partners before having that information in hand could leave a bad first impression.

The strategy can be developed by considering several questions. Some general questions that will aid in strategy development across all potential partners include:

- What communication materials will best convey the “need opportunity” to potential partners?
- In addition to direct, active efforts to contact potential partners, what Web-based or other tools can be utilized to announce the opportunity?

Yet some questions also should be considered for approaching each specific organization:

- Does a technology appear to exist that could readily fulfill the need or are more collaborative efforts required?
- Whom should be targeted within each organization (e.g., vice presidents of R&D) and how should they be approached?
- What contacts can be capitalized upon from previous interactions, collaborations, or relationships?

The answers to these questions will guide the formulation of the strategy for seeking out qualified potential partners.

3. SEEK

This phase involves implementing the strategy and establishing contact with potential partners to determine the extent to which they are interested in partnering and qualified to do so.

3.1 Develop Communications Materials

The types of communications materials that should be developed is dependent upon the complexity of the need and the number/variety of potential partners. Most potential partners will need to see something in writing, so a fact sheet, Web site, or some such tool is often useful.

Regardless of the tool selected, its text should be developed by a technical writer who can describe the “need opportunity” with sufficient detail and clarity while using terminology that is easily understood by the potential partners. Experienced writers—particularly those with a business or marketing focus as well as a capacity for understanding technical topics—avoid jargon that might be obvious within the organization’s own field but would be confusing to those in other markets and technical areas. In addition, they are capable of writing text that quickly engages readers, effectively describing the potential benefits of partnership and thus encouraging further reading and consideration of the opportunity being presented. The writer should consult with the Need Owner to confirm that text is accurate and appropriate (i.e., that no sensitive or enabling details are being revealed and thus compromising IP protection). Photos that are representative of the technical need and relevant future uses often are helpful. Images with an application focus rather than technical drawings will be more eye-catching for potential partners.

In the case of a fact sheet, the finished product is a two-page, marketing-focused document that includes the following information:

- A three- or four-sentence introduction to the need on the front page as well as a detailed overview of the need on the back page
- A list of requirements associated with the need, such as precision, accuracy, functionality, and other specifications
- A list of possible dual-use applications for the resulting technology, which should help potential partners recognize the value of partnering for collaborative R&D

If extensive information relevant to the need is available (e.g., white papers, facility brochures, capabilities portfolios), the fact sheet could include a URL to a Web page where these additional details and relevant background information can be provided. It is crucial that the fact sheet not be expanded beyond the two-page format to accommodate the additional information. The fact sheet should not overwhelm readers with too many details. A long, text-heavy document will not be read by potential partners and therefore they will not even consider the opportunity. Rather, a well-designed, well-written two-page fact sheet serves as a means to capture potential partners’ attention and build their interest. Those who are interested will then go to the Web site for the relevant in-depth information.

3.2 Contact Potential Partners

Following the strategy developed as described in Section 2.4 and using the communication materials described in Section 3.1, one begins establishing contact with and interviewing potential partners.

These interactions begin with a brief introduction of the organization and the fact that R&D partnerships are being sought. After the specific need is described, the interview of the potential partners should include questions such as the following:

- What are some of the key capabilities or technologies within your area of expertise that you feel overlap with this need?
- Do you have specific project or product challenges that correspond to the described need?
- Could a partnership improve your position?
- What could you offer to the engagement if you were to enter into a partnership?
- Have you ever worked with an organization such as ours? Have you participated in other kinds of collaborations or joint ventures?
- Are there funding opportunities that you will be applying for where a partnership might be beneficial?
- Is there information that would help you determine your potential for working under an R&D partnership?
- Do you have any papers or other materials on your organization related to this need area?

Some questions that are specific to the need also are appropriate. For example, potential partners who do not traditionally work in aerospace should be asked whether their technologies have been tested in harsh environments and, if not, whether there is interest in or a benefit to doing so.

The answers to these questions will indicate not only an organization's interest in collaboration but also its technical and financial capabilities to do so.

3.3 Evaluate Potential Partners

The analyst should continually re-evaluate and update each potential partner's A-B-C ranking. In considering whether an organization is still (or should be moved up to) an A-level partner, one should look beyond simply whether the company has the right technology or is closest to developing the solution. As discussed in the 2005 "Investigate before Investing" IAC paper, a company with a solution that is 80% complete

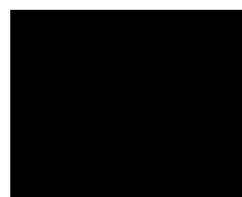
might not be as good a partner as a company with a solution that is 40% complete if the former has resource or other issues and the latter is willing and able to direct its resources into the partnership.

As more information is learned about a potential partner and its ideas for solutions, those details will affect its ranking. In some cases, an innovative concept for partnering might emerge that would move a B-level partner up to an A-level. Conversely, a potential partner might mention details that could constrain the partnership vehicle previously envisioned, perhaps reducing an A-level partner to a B-level.

In most cases, the process so far has not involved Need Owners beyond the assessment interview and their input on the communication material(s). Until the lengthy list of potential partners has been narrowed down to include only interested and qualified partners, the only reason to involve the Need Owner might be to obtain additional details to aid the "Contact Potential Partners" activity. However, before the Secure phase can begin, the Need Owner must be consulted. Potential partners considered by technology transfer staff/analysts to be A-level might not be viewed as such by the Need Owner. And since the Need Owner is going to be working with a successfully secured partner, that individual should have "veto" authority over the list of organizations with which the upcoming Secure efforts will be pursued. Therefore, a meeting should be held with the Need Owner to present a summary of the Seek phase findings and obtain input on which organizations are of interest.

4. SECURE

This phase involves meetings between the Need Owner and the organizations that might help address the technical need. The goal of these meetings is to find a "sweet spot" where the needs and offerings of each organization closely align



with the other's, suggesting that a mutually beneficial arrangement is possible. The phase concludes with either successfully negotiating a partnership agreement or re-strategizing to address

the changing landscape.

4.1 Schedule Meetings

Although sensitive and enabling information was not included in the Seek phase's communication materials, such details will need to be discussed during the Secure phase. Therefore, a non-disclosure agreement (NDA) likely will need to be

developed and signed prior to meetings between a potential partner and the Need Owner.

Aligning the schedules of the various individuals involved—including the Need Owner, researchers at the potential partner organization, and the internal (or consultant) technology transfer personnel—can be challenging and should not be underestimated. Similarly, unless all parties are located near each other, extra time and costs would be associated with scheduling on-site or other face-to-face meetings. Therefore, it is worth exploring various technology options that allow for effective meetings without requiring costly and time-consuming site visits. At a basic level, one can consider teleconferences. A relatively recent development that can be useful in these situations are Internet-based meetings, such as those offered by WebEx™, GoToMeeting™, and IBM's Lotus Sametime software.

4.2 Prepare the Participants

Effective meetings to explore the possibilities for a collaborative R&D partnership require effective preparation of both parties.

The internal Need Owner should be given information about the potential partner that was obtained during the interview described in Section 3.2. These details are best conveyed in a brief (one-page) memo outlining key information about the organization and its areas of expertise, its capabilities, and its technologies that relate directly to the need. Although the potential for collaboration may go well beyond what is required for the original need, summary-level information related to the specific need will help technical personnel focus their part of the discussions.

In a similar vein, the potential partner should receive information that will prepare its representatives for the questions that the Need Owner is likely to ask. In discussions or via e-mails, the need should be reiterated, emphasizing (1) the aspects that are particularly challenging and (2) that focusing on possible solutions and the information directly relevant to the need is an excellent starting point.

This idea of focusing the discussion might seem counter-intuitive, but experience has shown that this approach is effective. Allowing the discussion to “start small” and focus on the specific need and how the partner might be able to solve it helps both parties see a connection between their organizations and visualize working together. Once they recognize the value they offer each other for one project, the parties will begin to identify other opportunities for collaboration. This is particularly important when the potential partner is a large organization. Focusing on the many

facets of the potential partner might prevent the Need Owner from grasping conceptually and practically how to work with that organization. A “big picture” focus or too much data about the potential partner might obfuscate the fact that the two organizations appear to be well matched.

4.3 Facilitate Meetings

The technology transfer or other personnel who are facilitating the meetings should gather strategic information in advance that can be useful for when the parties agree that the potential for collaboration is there but are unsure of how to proceed. If this occurs, the facilitator can suggest next steps to prevent partnership development from becoming stalled. Such next steps might include the following:

- Providing information about (or offering a tour of) the facilities or capabilities that are of interest to the partner (or vice versa)
- Mentioning technologies—either specific inventions or broader research areas—that might be of interest to the partner (if they were not mentioned during the interview described in Section 3.2)
- Suggesting a possible funding opportunity that the two organizations could pursue jointly
- Discussing the possibilities for specific partnership vehicles, reminding participants that their R&D ideas eventually must be translated into a practical arrangement

At the conclusion of each meeting, the facilitator should help the parties identify the “next steps” for moving toward a partnership agreement. As an example, during the meeting the potential partner identified some specific information required from the Need Owner. At the close of the meeting, the facilitator should remind the parties of this and any other “action items” that each is responsible for before the next meeting. (Scheduling a date for the next meeting before ending this meeting also is important.) Doing so helps to lay out a productive path toward making partnership a reality.

4.5 Negotiate Agreement

The most effective approach for negotiating a partnership agreement is to focus on finding the best possible arrangement that will be a win-win proposition that will provide ongoing benefits.

In some cases, the negotiations might require a valuation assessment of what is being offered by the potential partner to accurately estimate its financial value. This valuation provides verification of the make-buy decision.

The negotiation discussions also should include the following elements, which should be specified in the final agreement:

- A statement of work that outlines each party's responsibilities
- Details of the ownership of and rights to new IP that results from the partnership
- An explanation of the rights to data
- Where any equipment will be stored
- Future commercialization/use rights for resulting IP
- The consequences of deviation from the agreement (i.e., what happens if one party does not fulfill its responsibilities)

It should be noted that no partnership deal is final until the agreement has been signed. Therefore, in proceeding along the path toward partnership, one should constantly take into consideration the new information obtained along the way and re-evaluate whether continuing toward a partnership agreement is appropriate. One should not be afraid to stop or change directions rather than continue inexorably toward an unsuccessful partnership.

5. CONCLUSION

The Strategize-Seek-Secure process for finding and evaluating new partners for conducting collaborative R&D—for aerospace or indeed any other technical area—can be summarized as follows:

- Identify all possible partners using appropriate keywords and searching relevant databases and other information sources
- Review and analyze the entire list of organizations, down-selecting for those that are truly relevant potential partners
- Rank the potential partners according to those that have the most to offer as a partner (A-level), those that have less to offer but are still good potential partners (B-level), and those that have some overlap in capabilities but are less-than-ideal partners (C-level)
- Develop communications materials for the effort as well as the strategy for approaching each level of potential partner, ensuring that the interviewer(s) are well prepared before contacting A-level partners
- Interview appropriate personnel at the potential partner organization to determine the interest in collaboration, qualify the

organization, and verify that it is a “good fit” as a partner

- Facilitate meetings between the Need Owner and an interested, qualified potential partner, preparing each party with appropriate information to help ensure discussions are productive and successful
- As parties begin to agree that a partnership is appropriate, negotiate an arrangement that allows both parties to benefit while including the necessary clauses related to IP and other coverage

Throughout this process, one should remember the Confirm step on the 6-S flow chart (Figure 1). This step is embodied in the vetting of potential partners, including the ranking and re-ranking of their position according to the available information. Similarly, the frequent reconsideration of a potential partner during negotiations—and even re-evaluating whether **any** partnership should be pursued—is essential.

When pursued within the context of a proactive, efficient, effective methodology such as the “6-S for Partnership Development Success,” this approach helps ensure that an organization is maximizing the returns on its own R&D investment by leveraging the investments of other organizations.

6. ACKNOWLEDGEMENTS

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