A WORD TO POTENTIAL INDUSTRIAL PARTNER COMPANY REPRESENTATIVES

The following document details characteristics of ideal project- and business-cases we are encouraging industry to provide to the MRSD-degree Program, for students to work on in teams as part of their two-semester long Project and Business Courses. The one-page descriptions for each are intended to highlight characteristics and features for both, as they are different, to help industrial partners craft a project/business-case description they are interested in having students pursue. There is no cost to the industrial partner associated with this request; however, we encourage you to consider designating a POC, should your project/business-case be picked by a team, as it will not only enrich and bring realism to the project and educational experience, but would also result in far more realistic and usable results that could be of value to the industrial partner. Potential roles for industrial partners or those associated with the MRSD program, are listed on the last page.
STUDENT-TEAM PROJECT FOCUS - DESCRIPTION

OVERVIEW

A proposed project is intended to allow the students to work on a hands-on real-world problem that is focused on a particular market, application and even (preferred) technology solution. A student team would be required to take the proposed project description and develop a clear application/mission description, identify requirements, develop system specifications that are reflected in a system design they take from a conceptual to a final design, prototype development, testing and validation and demonstration; all in their MRSD Project Course. This course will expose them to working as a team and understanding and implementing through a hands-on process all the mechanical, electrical and software elements required for the prototype. The process will take them through a methodical system-based approach, and include project-planning, -management and budgeting/-tracking activities, based on their limited time (9 months) and budget (a few $K).

WHAT INDUSTRY NEEDS TO PROVIDE – PROJECT DESCRIPTION

We seek a brief descriptive title for the project that provides some idea of the focus/type of project, followed by a description of the application, market, technical elements desired and how a successful solution would impact the marketplace. A requested project is thus somewhat specific about the ultimate application and market of interest to the company, and what preferred technical elements (hardware, sensors, software, algorithms, etc.) would be of interest in a demonstration. Note that the faculty and students may expand/modify the project, to ensure that it contains mechanical, sensing, and software elements, and thereby provides a complete broad-system experience and exposure for all team members.

Examples of suitable proposed projects are (market, application, technology specific):

- **Autonomous Navigation**: Performance enhancement in automated waypoint following for human-safe navigation using Radar and camera systems for cost-effective vehicle-fleet retrofit.
- **Next-Gen Interfaces**: Optimal combination of novel haptic interface modalities (gesture, sound, touch, etc.) to enhance man-machine interfaces for use in automated factory production lines.

An example of an unsuitable proposed project is (overly generic, non-implementation specific):

- **Market-Expansion**: Development of a robotic/automated solution to generate a $50M/year business opportunity in the unmanned vehicle market sector.

Note that the student team will develop a complete design for a system they are able to design/build/test/demonstrate, subject to their time and financial constraints, to include as broad a set of elements in the mechanical, sensing and software domain(s), to ensure a system-based educational experience in a multi-disciplinary team-setting.
STUDENT-TEAM BUSINESS-CASE - DESCRIPTION

OVERVIEW

A proposed business-case is intended to allow the students to develop their business-centric critical thinking skills, by focusing on a particular proposed business-area, and developing a complete business-case (so-called TDP: Technology Development Plan) that looks at markets/customers, competitive elements, technology-solutions, financials, marketing, development, production, sales, support, etc. Student teams will be required to develop a complete document as is typical in MBA entrepreneurship classes, subject to simplified financial reporting (quarterly/annually vs. monthly) and with the additional requirements of project planning, risk-management and production-plans. Hence this is a chance for industrial partners to explore a potential new product or product-enhancement or a completely new business segment, by having the students perform the up-front due-diligence in all critical areas, while receiving feedback from the industrial partner to guide them. The goal would be that the TDP serves as a first-step proof-of-viability to the industrial partner to pursue their interests further (or not, depending on the outcome).

WHAT INDUSTRY NEEDS TO PROVIDE – BUSINESS-CASE DESCRIPTION

We seek a brief descriptive title for the business-area that provides some idea of the focus/type of the potential market(s) and the need/problem/opportunity that is perceived as ready for a solution. The industrial partner may specify a particular new business area, product-line or –feature and leave the team to develop the TDP to identify the most promising market, sizes, competitors, technology options, preferred technical embodiment (concept/preliminary design; critical technologies), development program (tasks, schedule, budget, risk-management plan), production and service/maintenance plan, marketing and sales method/approach/plan and overall opportunity finances.

Examples of suitable proposed business-cases are (opportunity, generic phrasing, open-ended):

- **Dual-Use Technology**: Development of a business-case to consider dual-use applications of indoor-navigation sensors/software platforms from the commercial to government security markets.
- **Consumer Toys**: Business case for the implementation of low-power/silent actuation systems (motive hardware, electronics, controls, interfaces) on commercial entertainment/education platforms for multiple/varied age-group customers.

An example of an unsuitable proposed business-case is (technology-specific, overly constrained):

- **Manipulator Actuator**: Business case for implementation of a harmonic-drive actuation module for an IED-capable robotic manipulation payload.

*Note that the student team will develop a complete TDP as a deliverable in writing and presentation format – see [http://www.ri.cmu.edu/ri_static_content.html?menu_id=442](http://www.ri.cmu.edu/ri_static_content.html?menu_id=442) for more detail on the TDP.*
INDUSTRIAL PARTNER - POC RATIONALE & OPTIONS

OVERVIEW

We encourage industrial partners to provide a POC for a proposed project/business-case. We believe this to be of great benefit not only for the students, but also for the company, as it allows them to take advantage of the student’s output (option-evaluation, risk-mitigation, feasibility, etc.), and to also observe the capabilities and intellect of some potential future interns/employees.

There are multiple ways an industrial partner may consider participating more actively as a POC, or even in ways beyond that. The potential options the MRSD degree welcomes you to consider, are listed below:

- **Point-of-Contact (POC):** Volunteer as a POC to provide technical, market and experiential perspectives to a project-team as they develop the proposed project all the way from requirements to a demonstrated prototype system. POC activities can range from e-mail to teleconferencing, face-to-face meetings and review/demonstration attendance; the type and frequency of interaction is completely determined by the POC in conjunction with the project team.

- **Equipment Loan/Donation:** Consider the loan, or even donation, of a critical subsystem in order to not only make the project more relevant to the industrial partner, but to also increase the fidelity, completeness and relevance of the team output to a level that is more readily applicable/transferable to the real-world application the industrial partner is interested in.

- **In-kind Facilities Access:** It might be possible and effective for an industrial partner to offer to a student team the ability to use a company-owned test-facility/site for the student team to carry out their critical testing and (re-)demonstration activities, to increase the level of realism and utility/evaluation-level to the company and heighten the educational experience.

- **Direct Financial Support:** The industrial partner is also welcome to consider providing any level of cash to their respective team(s), for them to use in their pursuit of increasing the size/fidelity/realism/relevance of their project prototype and its testing/validation and demonstration. It is expected that the industrial partner and the team will agree on a detailed list of components (hardware, software, etc.) that would be expected to be acquired for said funds.