



TECHNOLOGY PROJECT EVALUATION

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INTRODUCTION

The ITF board has announced a directive which is supported by members, for ITF to undertake significantly more “filtering” of projects before submission to the member representatives.

Although **Technology Project Evaluation** is not an ITF core competency and ITF regards its members to be the technology experts, we have extended due diligence to include ‘recommendations’, but still submit all applications for those who wish to carry on receiving them all. In addition, ITF monitors:

- The percentage take up of the projects recommended to members, and
- The percentage success of both finalising project financial commitment and contract launch within the targeted process time frame of nine months.

This document identifies some criteria by which projects are assessed; some of this we do already.

TECHNOLOGY PROJECT EVALUATION CRITERIA

- Fundamentals
 - Correctly completed Application Form
 - Researcher Confidentiality Agreement in place
 - Project Implementation Plan included
 - Project management capability
 - Defined below ([Click here](#) to link to relevant section)
 - Resources available to do the project
 - Project Costing
 - Company capability
 - Sponsorship likely at funding level being sought
- Technical
 - Technology Readiness Level (TRL)
 - ITF will assign a TRL to proposals received - see notes on TRL below ([Click here](#) to link to relevant section)
 - TRL 0 is very much blue sky research and not an area in which ITF would typically be involved
 - ‘Pioneer’ projects probably come under TRL 1 or TRL 2
 - TRL 6 - 7 is at the other end of the scale as actual final commercial implementation and would not typically be funded by ITF. TRL 6 would be considered as implementation, but in certain circumstances could be considered as field trials (and potentially funded by ITF).
 - TRL 3, 4, or 5 is prototype development and TRL 5 would be moving to field trials, a key milestone for ITF members
 - There are obviously some overlaps on the scales
 - Innovation
 - Is it new?
 - Or, is this another “me too” project

- Proposed solution
 - Clear project description
 - Scope and Complexity
- Intellectual Property (IP) Ownership
 - Legislation compliance (where applicable)
 - Does the developer own the IP? If not, do they have agreement from IP owner to use the IP?
- Strategic Alignment
 - With Members drivers
 - With theme/challenge
 - Degree of innovation/originality
 - Political sanctions
 - When it is aware of any political sensitivity, ITF will highlight that it is dealing with a proposal from a sanctioned country. Nevertheless, ITF does not take any responsibility for individual member company policies with regard to sanctions.
- Benefits
 - Tangible (direct to sponsor)
 - Granting of royalty free licenses
 - Preferential access to products / services
 - Discounts on products / services
 - Intangible
 - Industry
 - Environment
 - Health & Safety
 - Community

TECHNOLOGY READINESS LEVEL

Technology Readiness Level (TRL) is a measure introduced by NASA and is now used by major companies around the world including some of ITF Members to assess the maturity of evolving technologies. This can be applied to any new technology which is usually subject to fundamental research, feasibility, experimentation, development, and increasingly realistic testing. Technology can be at component, software, or system level but has to be sufficiently proven before entering into an operational system.

ITF have adopted the TRL system as part of our project evaluation process to indicate the extent to which a technology is "ready for use" given specified qualification factors/requirements. A TRL can only be used with reference to a specific set of operating parameters and environmental conditions. If the operating regime or the planned environment changes, the TRL may be downgraded for more demanding conditions, or upgraded for less demanding conditions.

The NASA system has been adapted for use within a subsea production environment and has resulted in a API recommended practice (API RP 17 N); discussions are currently on-going to turn this into an ISO standard.

As part of the upstream oil and gas sector ITF has chosen to adopt the API system. The illustration below shows the stages of TRL used by ITF and the table defines each stage of the TRL and shows the comparison between the API and NASA levels. Each proposal submitted to ITF is awarded a TRL to quickly identify the maturity of the project.

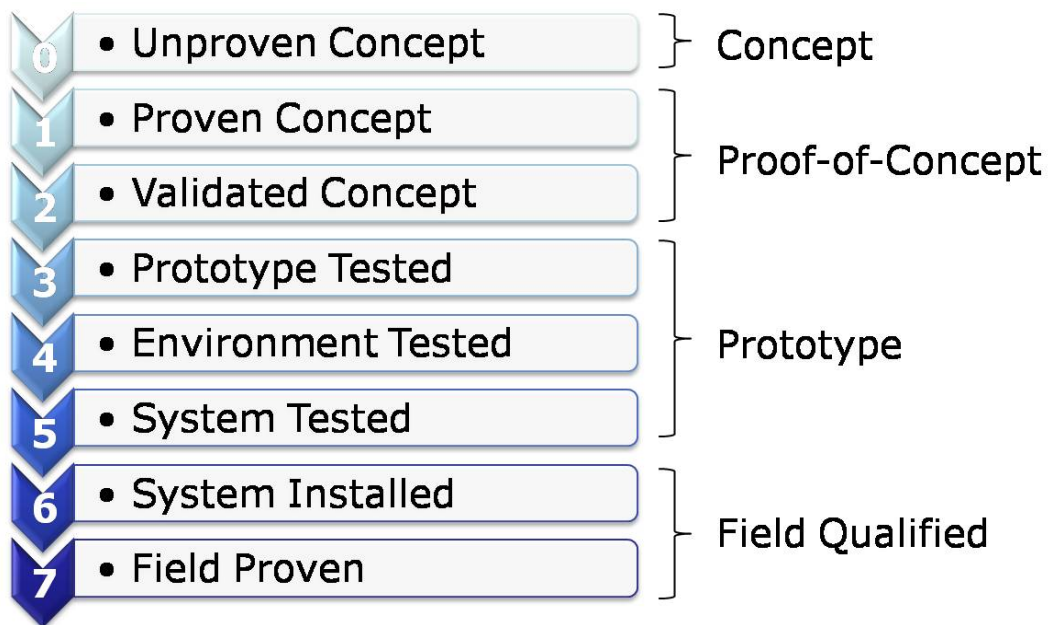


Figure 1 - ITF Technology Readiness Levels (TRL), adapted from API RP 17 N

	TRL (API 17 N)	Development Stage Completed	Definition of Development Stage	TRL (NASA)
Concept	0	Unproven Concept (Basic R&D, paper concept)	Basic scientific/engineering principles observed and reported; paper concept; no analysis or testing completed no design history.	1
Proof-of-Concept	1	Proven Concept (As a paper study or R&D experiments)	a) Technology concept and/or application formulated b) Concept and functionality proven by analysis or reference to features common with/to existing technology c) No design history; essentially a paper study not involving physical models but may include R&D experimentation	2
	2	Validated Concept (experimental proof of concept using physical model tests)	Concept design or novel features of design is validated by a physical model, a system mock up or dummy and functionally tested in a laboratory environment; no design history; no environmental tests; materials testing and reliability testing is performed on key parts or components in a testing laboratory prior to prototype construction	3
Prototype	3	Prototype Tested (System function, performance and reliability tested)	a) Item prototype is built and put through (generic) functional and performance tests; reliability tests are performed including: reliability growth tests, accelerated life tests and robust design development test programme in relevant laboratory testing environments; test are carried out without integration into a broader system b) The extent to which application requirements are met are assessed and potential benefits and risks are demonstrated	4
	4	Environment Tested (Pre production system environment tested)	Meets all Requirements of TRL 3; designed and built as production unit (or full scale prototype) and put through its qualification programme in simulated environment (e.g. hyperbaric chamber to simulate pressure) or actual intended environment (e.g. subsea environment) but not installed or operating; reliability testing limited to demonstrating that prototype function and performance criteria can be met in the intended operating condition and external environment	5
	5	System Tested (Production system interface tested)	Meets all the requirements of TRL 4; designed and built as production unit (or full scale prototype) and integrated into intended operating system with full interface and functional test but outside the intended field environment	6
Field Qualified	6	System Installed (Production system installed and tested)	Meets all the requirements of TRL 5; production unit (or full scale prototype) built and integrated into intended operating system; full interface and function test program performed in the intended (or closely simulated) environment and operated for less than three years; at TRL 6 new technology equipment might require additional support for the first 12 to 18 months	7
	7	Field Proven (Production system field proven)	Production unit integrated into the intended operating system, installed and operating for more than three years with acceptable reliability, demonstrating low risk of early life failures in the field	8, 9

PROJECT MANAGEMENT CAPABILITY

ASSESSING CAPABILITY

Measuring project management capability is a difficult exercise. ITF uses the following three metrics to assess developer capability:

- Projects completed on time
- Budget management
- User satisfaction

Nevertheless, in assessing capability there are a number of fundamental requirements in the management of a project. These include the management of Scope, Time, Cost, Quality, Risk, Human Resources, Procurement, Integration, and Communication.

Trying to evaluate a project plan for a technical project may be difficult and may be a hindrance to later stages of the project if stuck to rigidly, but a plan can be modified with good reason.

In order to evaluate a project management plan at the proposal stage, some pointers that have been adopted in our internal evaluation include:

- A well balanced scope.
 - The plan must set out what is not only required at an early stage but what will be executed at the later stages.
 - Some parts may be more detailed than others; early stages may be detailed whilst later stages may be rough and diffuse, this implies a distant planning horizon. If this is the case, consider phasing the project.
- Plan must set out the importance of a good results path.
 - The plan should reflect the goals of the project and set out the areas in which results are to be achieved.
 - Show the benefits of the results through milestone plans.
- Check out the milestone formulation

If the above is not conclusive then a second step is adopted which involves the use of some questioning of the developer, either direct or through simple questionnaire. Questions are asked on the following lines:

- Summary
 - Any evidence of need for project management?
 - Is there any structured approach to projects?
 - Evidence of any effective project management?

- Culture
 - Awareness of benefits of project management?
 - Is PM accepted policy on all projects?
- Process
 - Are there any formal processes?
 - How much do these (if any) depend on individual skills?
 - Is there active allocation of management and budgets at all levels?
- Experience
 - Is evidence of understanding project principles or language?
 - Any formal training been undertaken?
- Application
 - Any evidence of structured application of PM?
 - Is there a dedicated resource?
 - Are any project tools used? Are they applied in an ad hoc manner?

APPLICATION TO ITF

ITF uses this information to categorise the need for either “Project Management” or “Outcome Management”?

We use two categories of developer; those that are classed as “Naive”, and those that are classed as “Novice”. Anything above this would not necessarily require ITF project management in any form.

The Naive developer is unaware of the need for management of projects, and has no structured approach to projects. Management processes are generally reactive, with little or no attempt to learn from the past or to prepare for future threats or uncertainties.

The Naive developer would require ITF Project Management.

On the other hand, the Novice has begun to experiment with project management, perhaps through a small number of nominated individuals, but has no formal or structured generic processes in place. Although aware of the potential benefits of managing projects, the Novice organization has not effectively implemented project management processes and is not gaining the full benefits.

The Novice developer would require ITF Outcome Management.

The Normal or Natural developer would already have a project management culture and systems in place for project management which are being actively pursued and applied as normal practice. It is unlikely that this type of developer would require ITF project/outcome management.