TRIZ and ARIZ

TRIZ is not just a theory, but proposes a precise algorithmic procedure as a methodology to be applied.

There exist several variants of this algorithm ARIZ (Algorithm for the Solution of Inventive Problems), the "official" one is ARIZ-85C, which is based on a version published by Altschuller in 1985. Others (D. Zobel) see little progress compared to ARIZ-77 (a version published by Altschuller in 1977) and recommend this somewhat simpler approach.

We use AIPS-2015 (Algorithm for the Correction of Problematic Situations), a version in the tradition of OTSM-TRIZ, which is also used in the Minsk TRIZ-Trainer.

TRIZ-Trainer – the First Stage of the Solution Process

The first stage of the solution process provides an accurate model of the "system as it is" that needs to be transformed to solve the problem. This phase consists of three steps

(A) Contextualise the problem. The system as a black box.

(B) Analyse and model the structural and procedural organisation of the "system as it is" – the "machine" in the terminology of the TRIZ-Trainer.

(C) Identify and localise the central contradiction, determine the operational zone and operational time, i.e. where and when the contradiction occurs, and establish possible hypotheses about the causes of the conflict.

From these hypotheses a task is formulated, which in the second stage is analysed in more detail.

TRIZ-Trainer – the First Stage of the Solution Process

First section "Clarification of the circumstances":

1. Identify the system to be examined as a black box and give it a "speaking name", from which the semantics of the system can already be roughly understood – what is the "useful product"?

2. Identify the *main useful function* (MUF) of the system. Investigate, if necessary, what *purpose* the system serves in the supersystem and, if applicable, determine the throughput required to operate the system (input required from the upper system for the functioning of the system).

3. Formulate the existing problem, which prevents the specification compliant behaviour of the system in the supersystem – the "undesired effect".

TRIZ-Trainer – the First Stage of the Solution Process

Second section "Conflict in the system":

4. Determine the components of the machine (the structural organisation of the system) as well as its mode of operation (the procedural organisation of the system). Often it is sufficient to focus on one of the two questions.
   Follow the general structure pattern "energy source, engine, transmission, tool, action, object being processed, useful product plus control".
   Here it is important to describe the main useful function (MUF) of the system, even if the problem is located in one of its components, because the resources used in the system are grouped around the MUF.

TRIZ-Trainer – the First Stage of the Solution Process

5. This MUF is in some relation to the "effect that cannot be completed without problems".
   This effect, as well as its relationship to the MUF, is now to be determined more precisely as the core of the conflict to be resolved.
   In this analysis, in particular the place and time of the conflict must be more precisely determined in order to prepare for possible later separation by time or place as as basic methods of resolution.

TRIZ-Trainer – the First Stage of the Solution Proces

Third section "Formulation of a hypothesis":

► Through a more detailed analysis of the "causes of conflict",
  one or several hypotheses of general nature are formulated,
  what measures in the sense of the *Ideal Final Result* would
  solve the problem.
  One of these approaches is formulated in more detail as a
  "task" for the second stage of the solution process in order to
  work on it with suitable TRIZ tools.

The Ideal Final Result

The **ideal final result** (IFR) describes the "system as required" as *target* of the transformation, without initially caring whether the formulated result can be realised in practice. In the further solution process, the obstacles to be overcome on the way to the IFR are identified and, based on the TRIZ methodology, strategies are developed how to overcome these obstacles in practice.

The IFR is one of the basic concepts of TRIZ. The IFR is an orientation in the sense of a "concrete utopia", which essentially determines the target corridor on which the further solution process concentrates in its second stage.