# Methods and Tools for Successful Management of Innovation Processes

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Invention Machine Corp.

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Jožef Stefan Institute, Slovenia

# Statement to Challenge:

Innovations are hard to predict. You can assign a certain number of expert hours to a project, but you can‘t guarantee that any specific level of innovation will hapen.

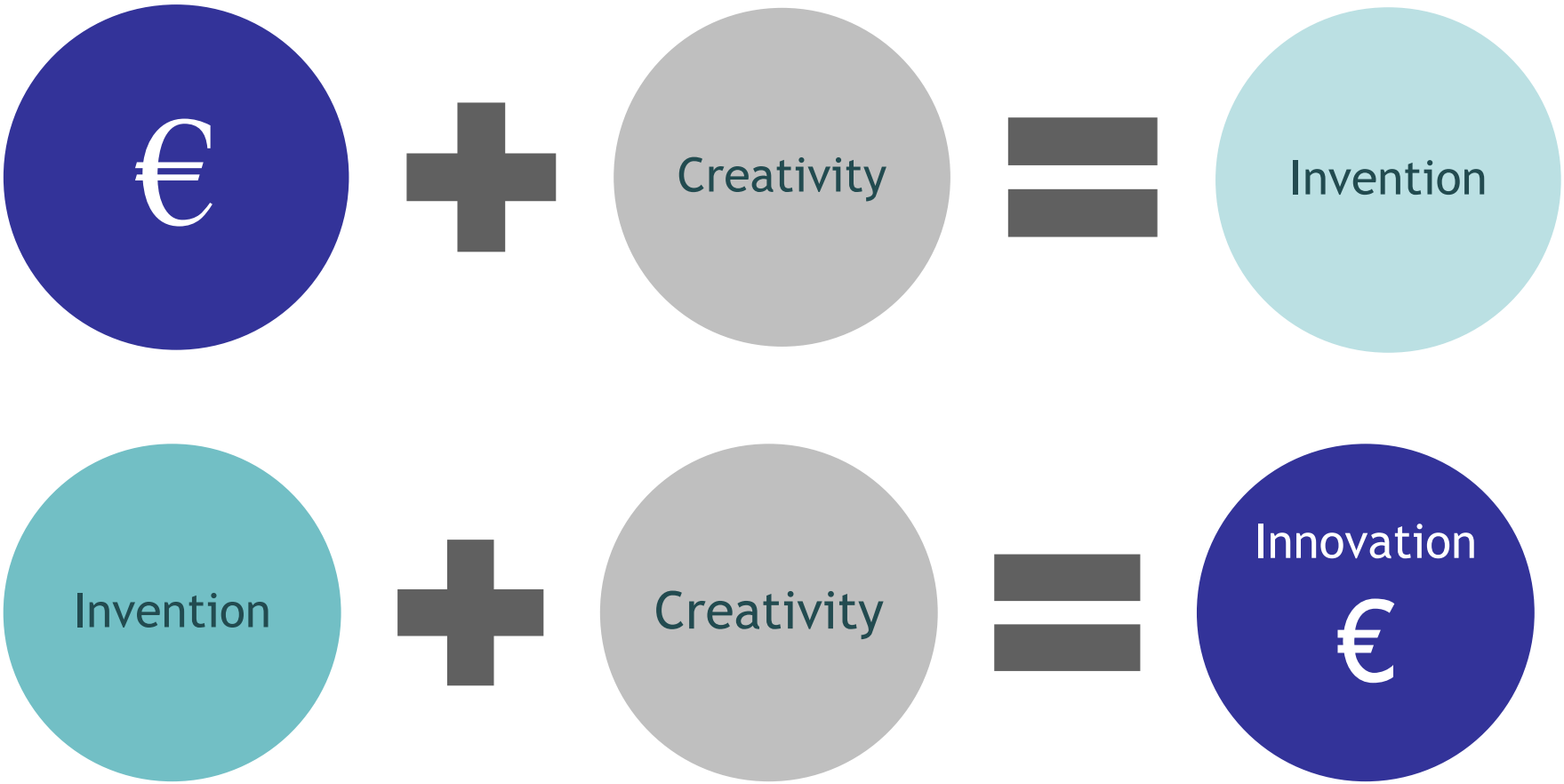
# Business Aspects of Innovations:

- Rare unpredictable event with potentialy important economic benefits
- Costs already consumed
- Scalability – revenue‘s order of magnitude
- Easy to store
- Added value over extendet time period
- Enabling patent protection
- Temporary competitive advantage
- Possible spill-over effects

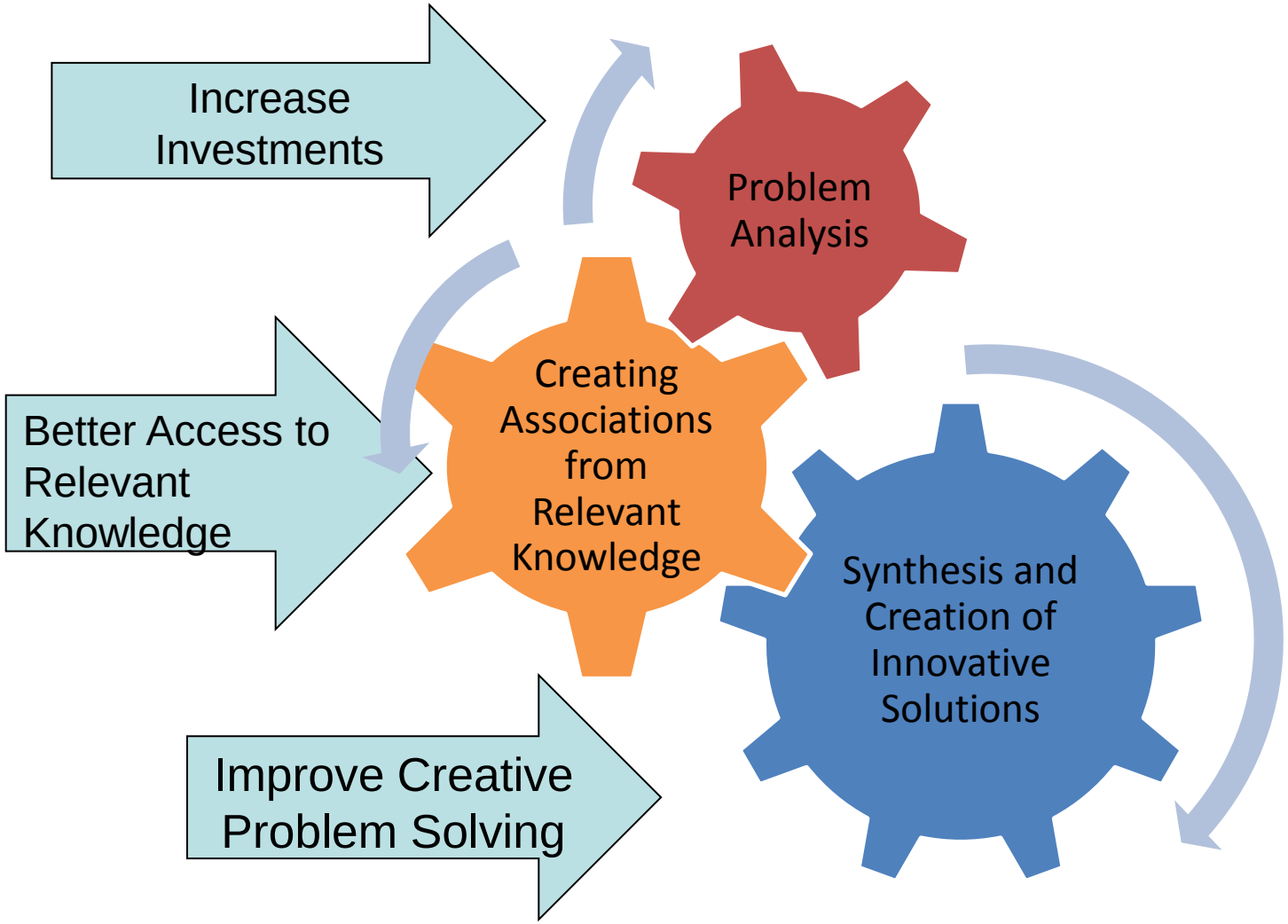
# Patents are Limiting Freedom to Operate

- A patent is a monopoly granted by a state to an inventor or his/her assignee for a limited period of time.
- Invention must be new, inventive (nontrivial) and useful or industrially applicable.
- The monopoly granted to a patentee is the right to prevent others from making, using, selling, or distributing the patented invention without permission.

# Inventions and Innovations



# How to Improve Innovation Process?



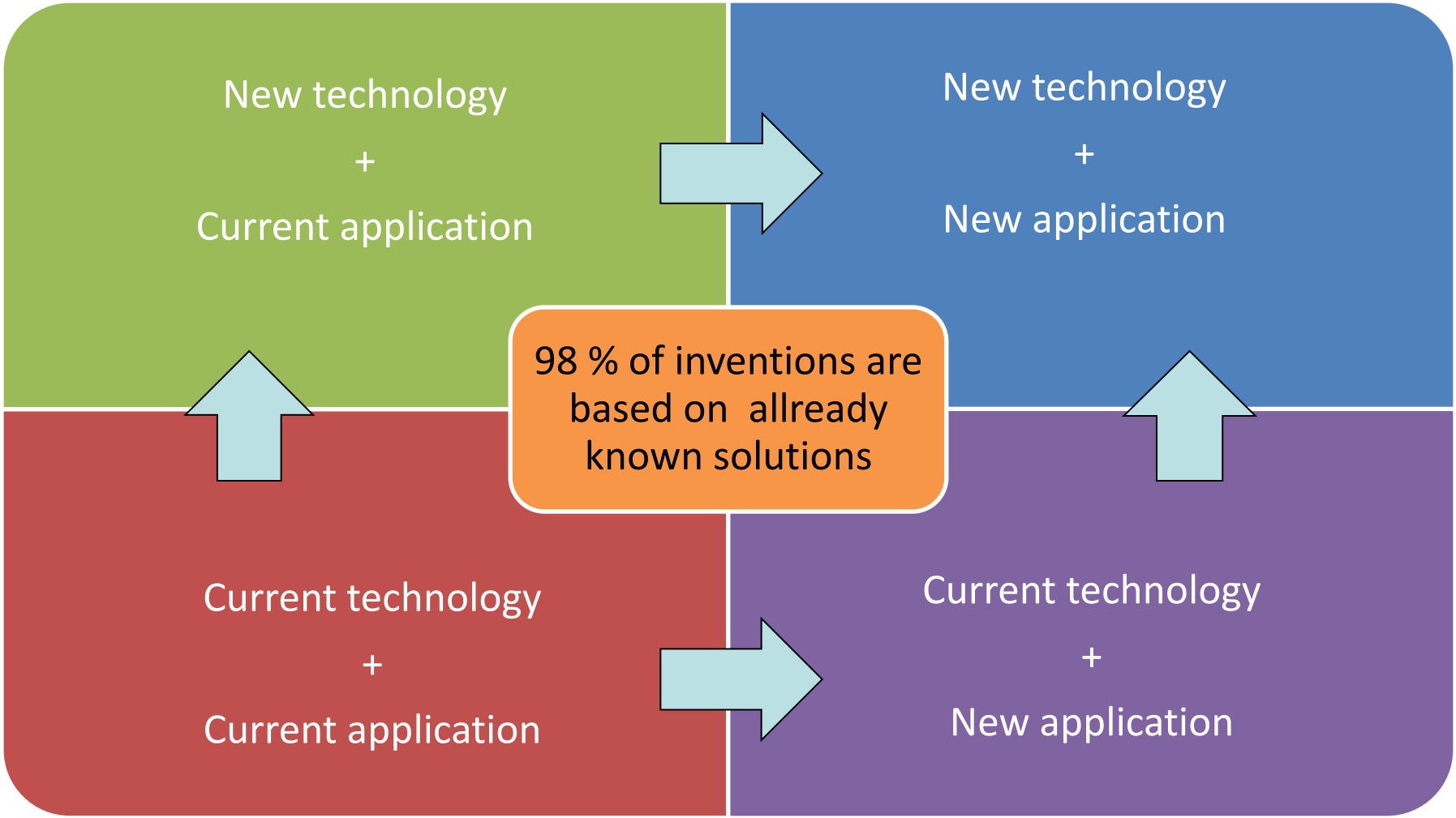
# Economic Succes of Innovations

# Pareto principles – Nonlinear distributions

## 80% of the effects come from 20% of the causes

- 80% of profits come from 20% of customers
- 80% of complaints come from 20% of customers
- 80% of profits come from 20% of the time you spend
- 80% of sales come from 20% of products
- 80 % of books sold come from 20 % of writers
- 80 % of wealth is in hands of 20 % of population
- 80 % of academic citations come from 20 % of authors
- 80 % of revenues from innovations come from 20 % of them

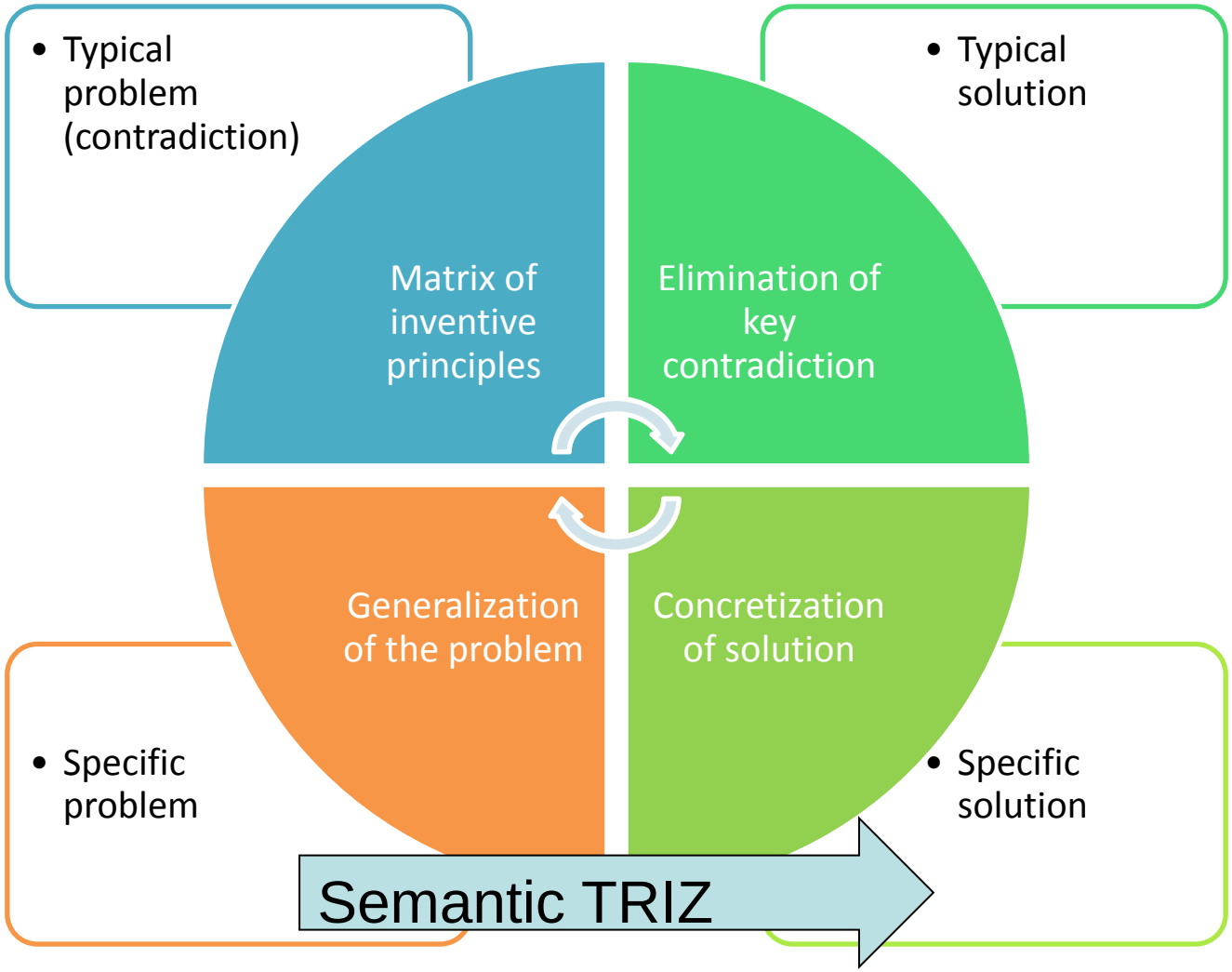
# Technology vs. Application



# TRIZ – Theory of Inventive Problem Solving

- Scientists, engineers and designers frequently face situations that qualify as contradictions, where improving one thing degrades another, or where requirements seem to ask you to go in two directions at the same time.
- Contradictions are frequently resolved through compromises, causing people to concede that they will not get the optimal situation they hoped for.
- TRIZ can help you to find an optimal solution, without compromises.

# TRIZ is Enabling  Change of View



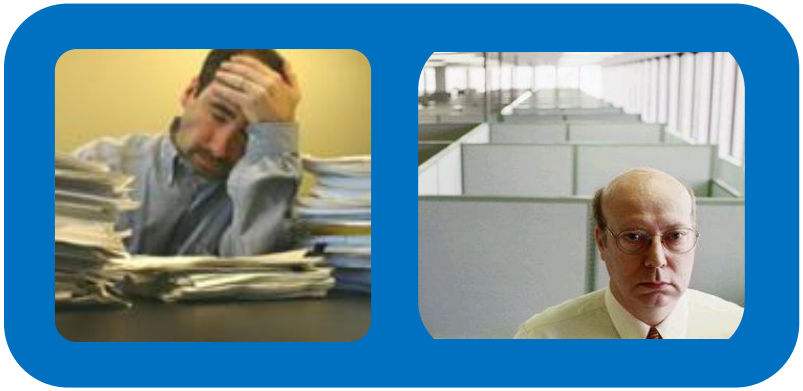
# What are this Companies doing differently?

| | |
|---|---|
| Aerospace & Defense | Pratt & Whitney, A United Technologies Company; BOEING; Honeywell; NORTHROP GRUMMAN; AIRBUS |
| Automotive | MAHLE; BOSCH; BENTLEY; Cummins; DELPHI |
| Consumer | Char-Broil; Unilever; KINGSDOWN; HERSHEY'S The Hershey Company; Leggett & Platt INCORPORATED; CSI |
| Energy & Environment | Shell; Statoil; APS Advanced Products & Systems TECHNOLOGY; VEOLIA ENVIRONNEMENT; SIEMENS; Eni |
| Industrial | JOHN DEERE; SAINT-GOBAIN; ATI Wah Chang; BRADY; JohnsonDiversey Clean is just the beginning |
| Life Sciences | Pfizer; IMMUCOR GAMMA; Medtronic; Johnson & Johnson; MEDRAD Performance. For life.™ |
| Technology | SONY; LG; CHRISTIE; FEI; SAMSUNG; TOSHIBA |

# Why Companies are Using Goldfire

- **Unable to leverage Internal knowledge**
- **Poor visibility into global content**

- Reinvention and redundant activity
- Lessons-learned & tribal wisdom not readily captured & reused
- Can't leverage or apply ideas from other industries



- **Problem & opportunity analysis incomplete**
- **Pace of innovation too slow**

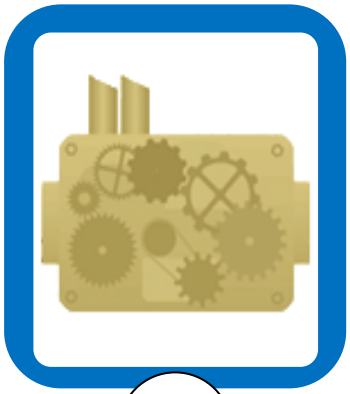
- Lack of timely, relevant insights
- Treat symptoms, repeat past errors, overlook known facts
- Idea generation not consistent
- Assumptions & past experience block creative thinking

# How Goldfire Can Help

1

**Access Relevant Content from Almost Any Source**

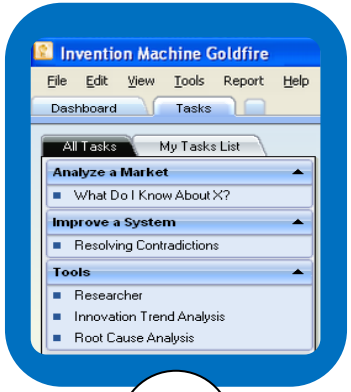
**Inside or Outside your Organization:**
- ECM systems
- PLM repositories
- Email
- Intranets
- Network Drives
- World Wide Web
- Goldfire Intelligence



2

**Transform it into Actionable Engineering Intelligence**

**Goldfire's Patented Technology:**
Reads and understands every document, transforming it into meaningful engineering intelligence.




3

**Knowledge Enable Critical Engineering Activities**

**Understands and Supports:**
- R&D
- Product development
- Product improvement
- Technology analysis
- QA
- Problem solving
- Patent research

4

**Reduce Costs / Increase Revenues**

**Benefits:**
- Faster time to market
- Reduced costs
- Better solutions
- New markets
- Knowledge reuse

# Access Relevant Content

- **Internal sources of value**
  - Private or shared folders; > 100 document types
  - Email, corporate repositories, PLM repositories
- **External content you value**
  - Competitor websites
  - Supplier websites
  - Customer websites


- **Goldfire Intelligence**
  - External content of high value to engineers & scientists
  - Global patent literature
  - Deep Web sites
  - Innovation Libraries

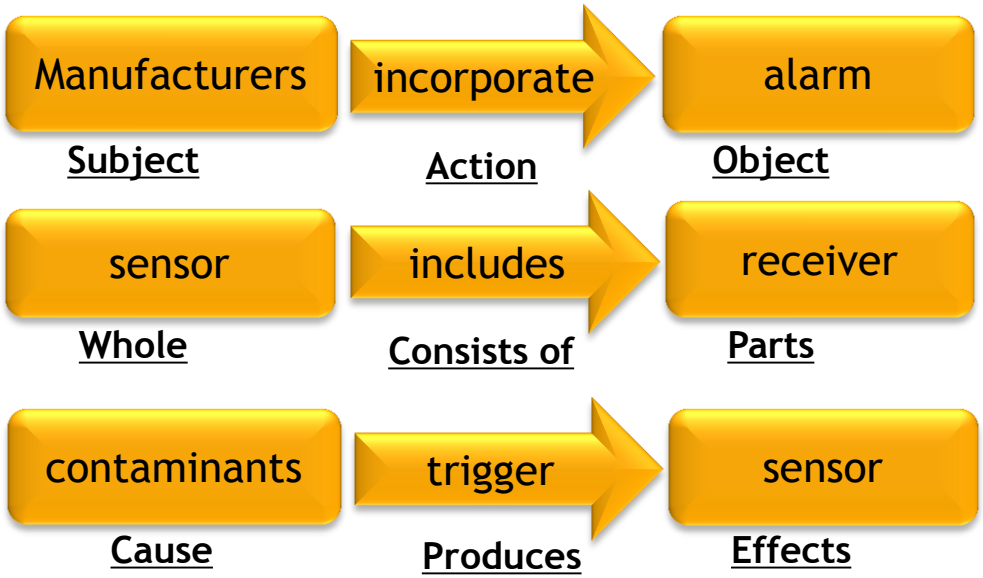
Goldfire Intelligence

# Create Actionable Innovation Intelligence

"Yet these contaminants can falsely trigger the sensor if they build up on the included emitter or receiver. To prevent such false triggering manufacturers incorporate an alarm output into the sensor circuitry."

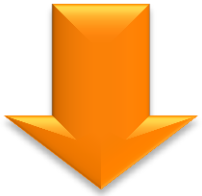
## Goldfire *Semantic Technology*

**Goldfire extracts underlying meaning, so you get back precisely relevant answers**



# Reduce Costs / Increase Revenues

- Reduced research time
- Elimination of redundant work
- Better problem & opportunity analysis



- Faster time to market
- Reduced Costs
- Better solutions
- New Markets
- Knowledge Re-use

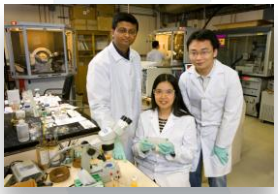
# Where can Goldfire help you?

- Market Analysis
- New Product Development
- Product Improvement
- Leverage IP

## Users Include:

**Engineers**

**Researchers**



**Scientists**

**Quality & Reliability**

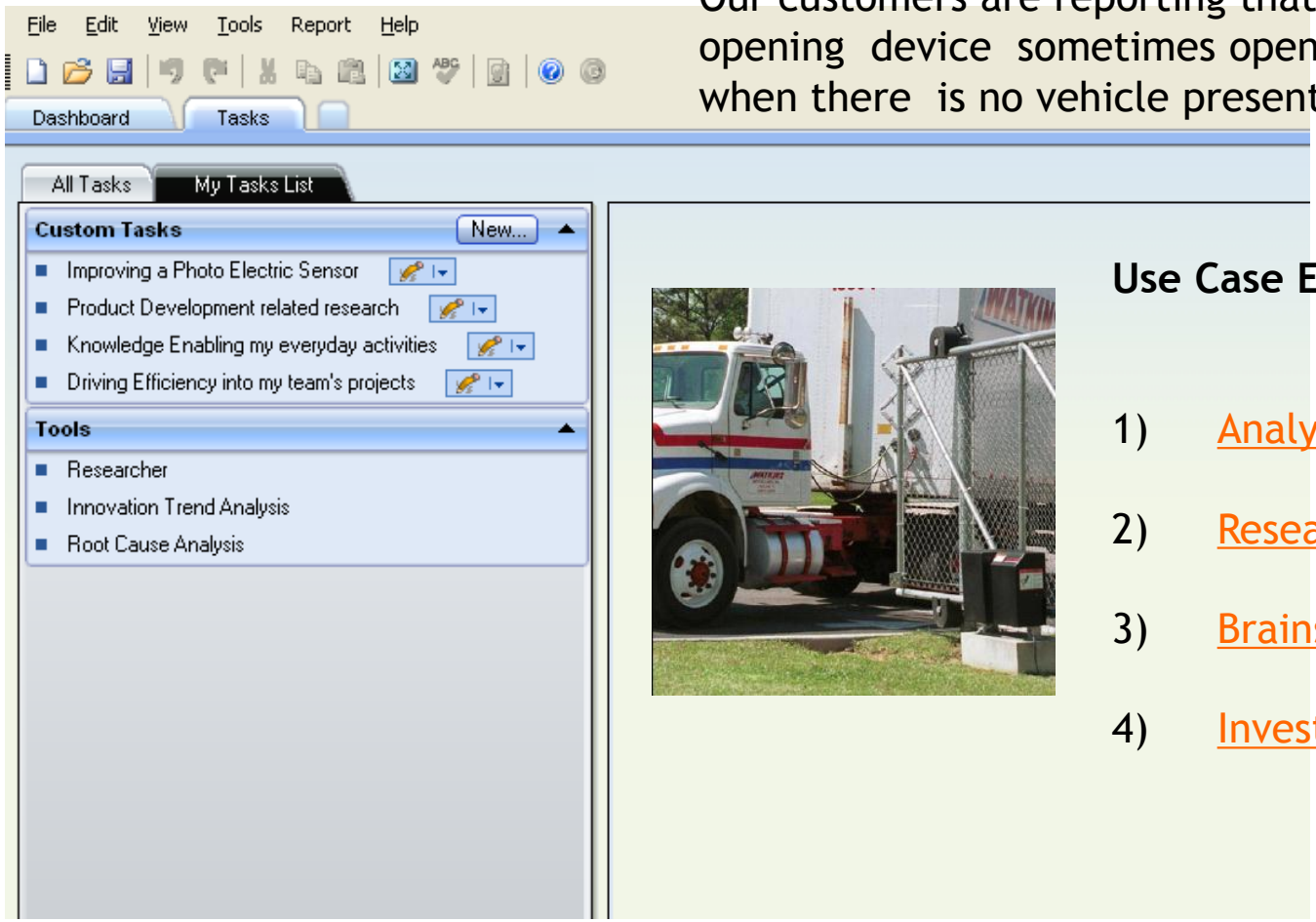
**Marketing**

**Business Development**

# Research, Development & Design - Examples

## Product Development Scenario:

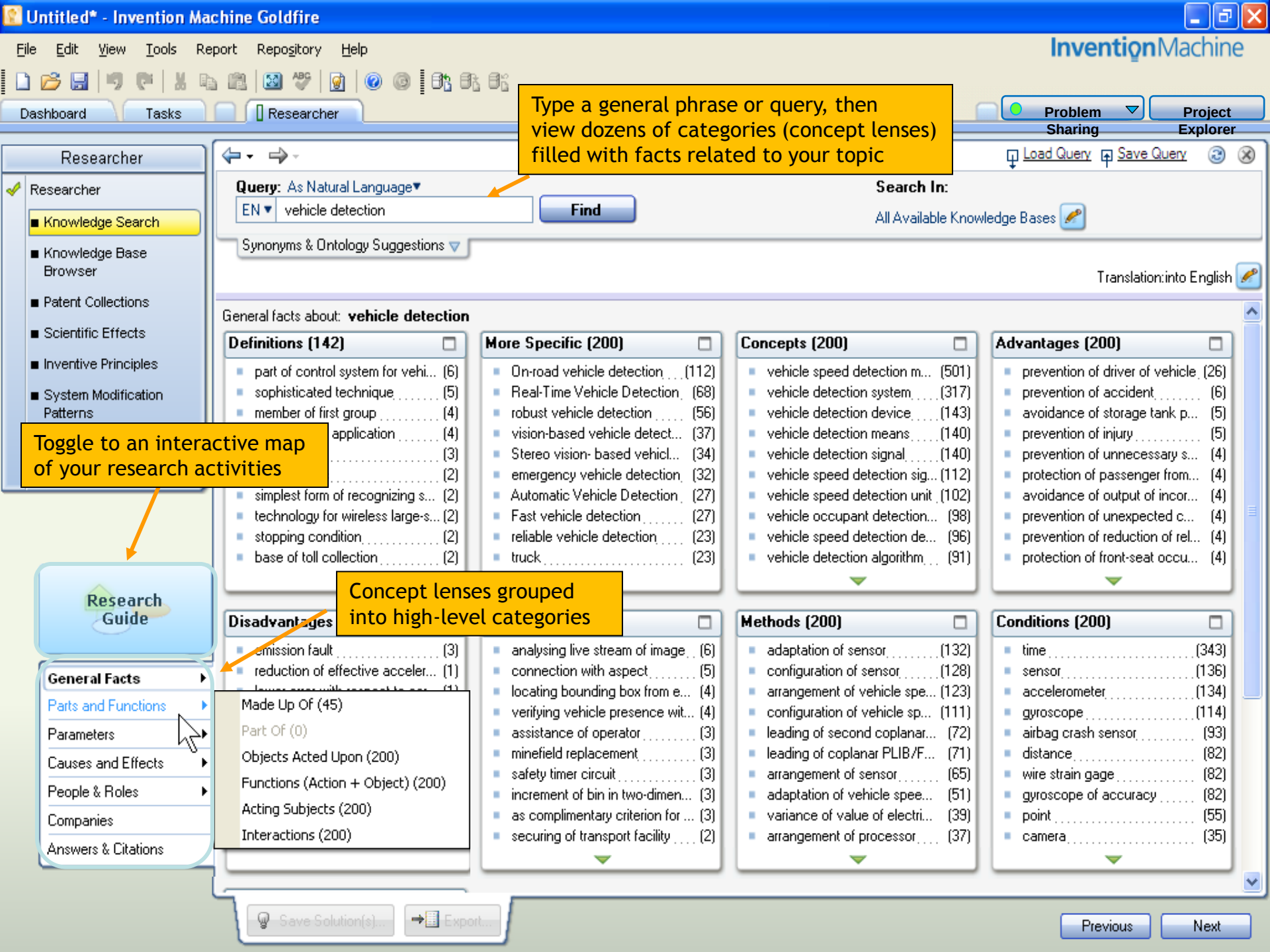
Our customers are reporting that our gate opening device sometimes opens the gate when there is no vehicle present






**Use Case Examples:**

1) Analyze a topic
2) Research a question
3) Brainstorm a Problem
4) Investigate a technology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Problem Sharing
Project Explorer
Type a general phrase or query, then view dozens of categories (concept lenses) filled with facts related to your topic
Researcher
Researcher
Knowledge Search
Knowledge Base Browser
Patent Collections
Scientific Effects
Inventive Principles
System Modification Patterns
Load Query
Save Query
Query: As Natural Language
EN
vehicle detection
Find
Search In:
All Available Knowledge Bases
Synonyms & Ontology Suggestions
Translation:into English
Toggle to an interactive map of your research activities
General facts about: vehicle detection
Definitions (142)
part of control system for vehi... (6)
sophisticated technique (5)
member of first group (4)
application (4)
(3)
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technology for wireless large-s... (2)
stopping condition (2)
base of toll collection (2)
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Real-Time Vehicle Detection (68)
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prevention of accident (6)
avoidance of storage tank p... (5)
prevention of injury (5)
prevention of unnecessary s... (4)
protection of passenger from... (4)
avoidance of output of incor... (4)
prevention of unexpected c... (4)
prevention of reduction of rel... (4)
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Concept lenses grouped into high-level categories
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point (55)
camera (35)
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Parameters
Causes and Effects
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Answers & Citations
Made Up Of (45)
Part Of (0)
Objects Acted Upon (200)
Functions (Action + Object) (200)
Acting Subjects (200)
Interactions (200)
Save Solution(s)...
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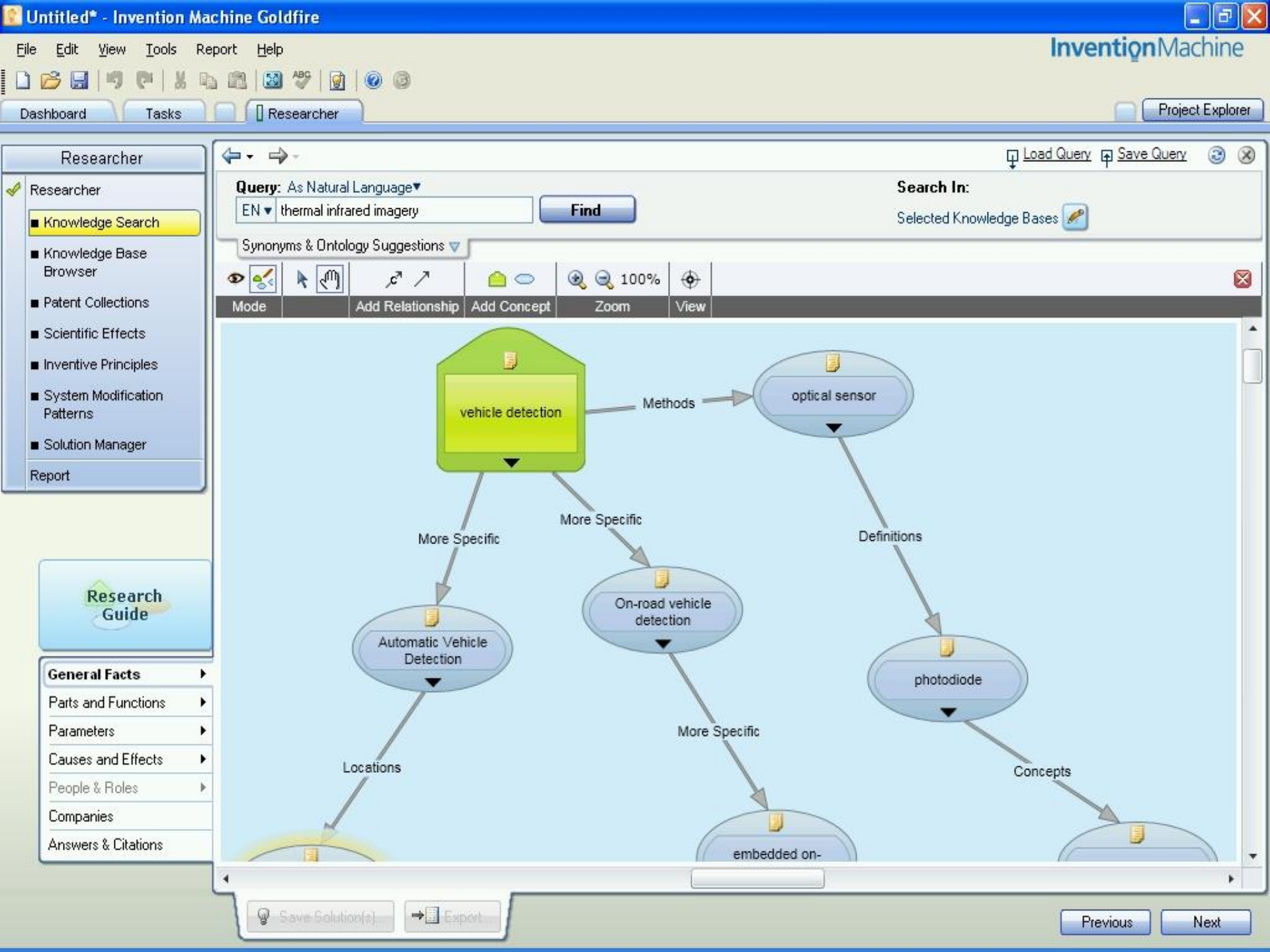
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Scientific Effects
Inventive Principles
System Modification Patterns
Solution Manager
Report
Load Query Save Query
Query: As Natural Language
EN thermal infrared imagery
Find
Search In:
Selected Knowledge Bases
Synonyms & Ontology Suggestions
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vehicle detection
Methods
optical sensor
More Specific
More Specific
Definitions
On-road vehicle detection
Automatic Vehicle Detection
photodiode
More Specific
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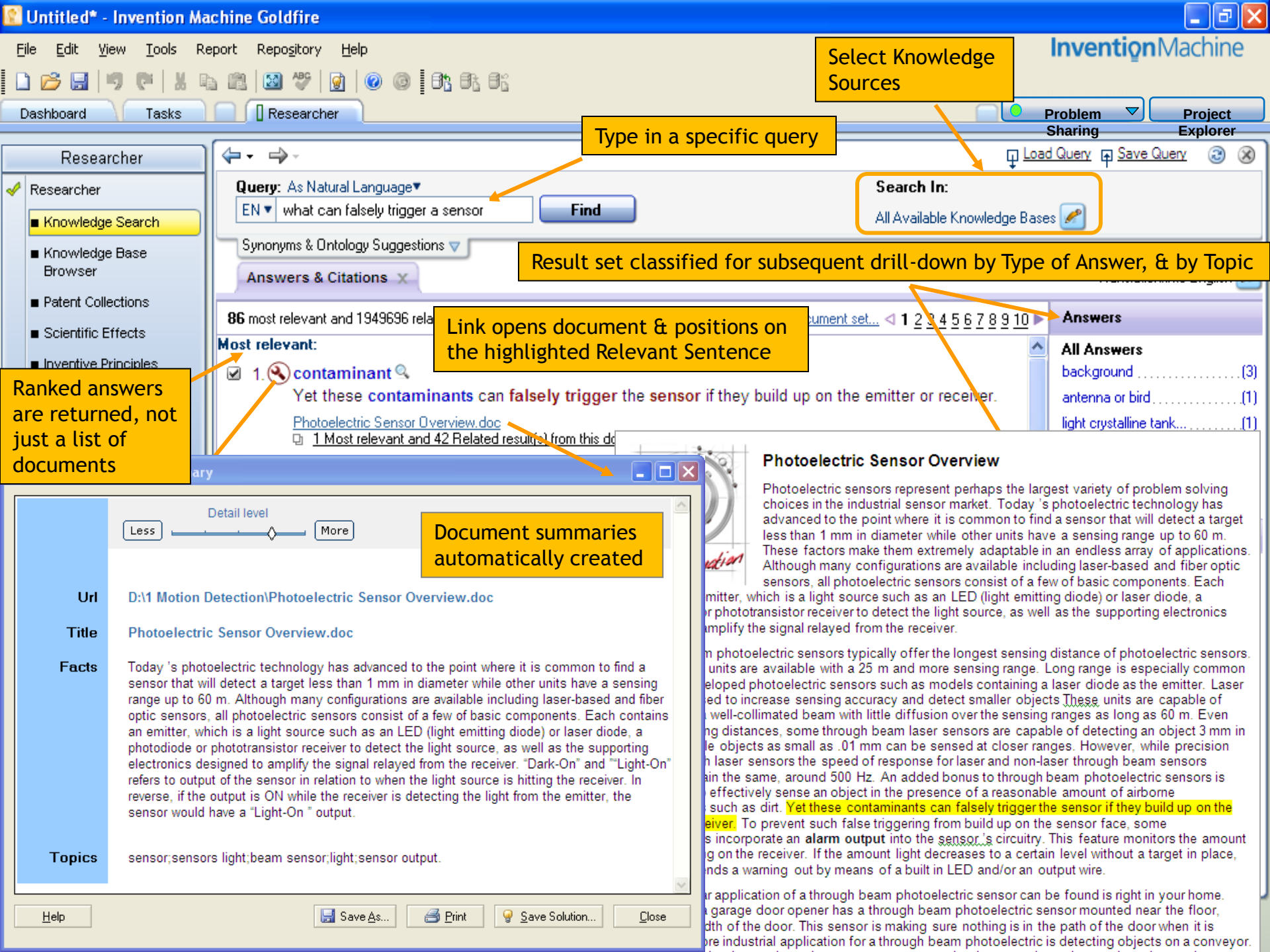
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Find
Search In:
All Available Knowledge Bases
Synonyms & Ontology Suggestions
Answers & Citations
Result set classified for subsequent drill-down by Type of Answer, & by Topic
86 most relevant and 1949696 rela
Link opens document & positions on the highlighted Relevant Sentence
Most relevant:
1. contaminant
Yet these contaminants can falsely trigger the sensor if they build up on the emitter or receiver.
Photoelectric Sensor Overview.doc
1 Most relevant and 42 Related result(s) from this do
Answers
All Answers
background (3)
antenna or bird (1)
light crystalline tank... (1)
Ranked answers are returned, not just a list of documents
Detail level
Less
More
Document summaries automatically created
Url
D:\1 Motion Detection\Photoelectric Sensor Overview.doc
Title
Photoelectric Sensor Overview.doc
Facts
Today 's photoelectric technology has advanced to the point where it is common to find a sensor that will detect a target less than 1 mm in diameter while other units have a sensing range up to 60 m. Although many configurations are available including laser-based and fiber optic sensors, all photoelectric sensors consist of a few of basic components. Each contains an emitter, which is a light source such as an LED (light emitting diode) or laser diode, a photodiode or phototransistor receiver to detect the light source, as well as the supporting electronics designed to amplify the signal relayed from the receiver. "Dark-On" and "Light-On" refers to output of the sensor in relation to when the light source is hitting the receiver. In reverse, if the output is ON while the receiver is detecting the light from the emitter, the sensor would have a "Light-On " output.
Topics
sensor;sensors light;beam sensor;light;sensor output.
Help
Save As...
Print
Save Solution...
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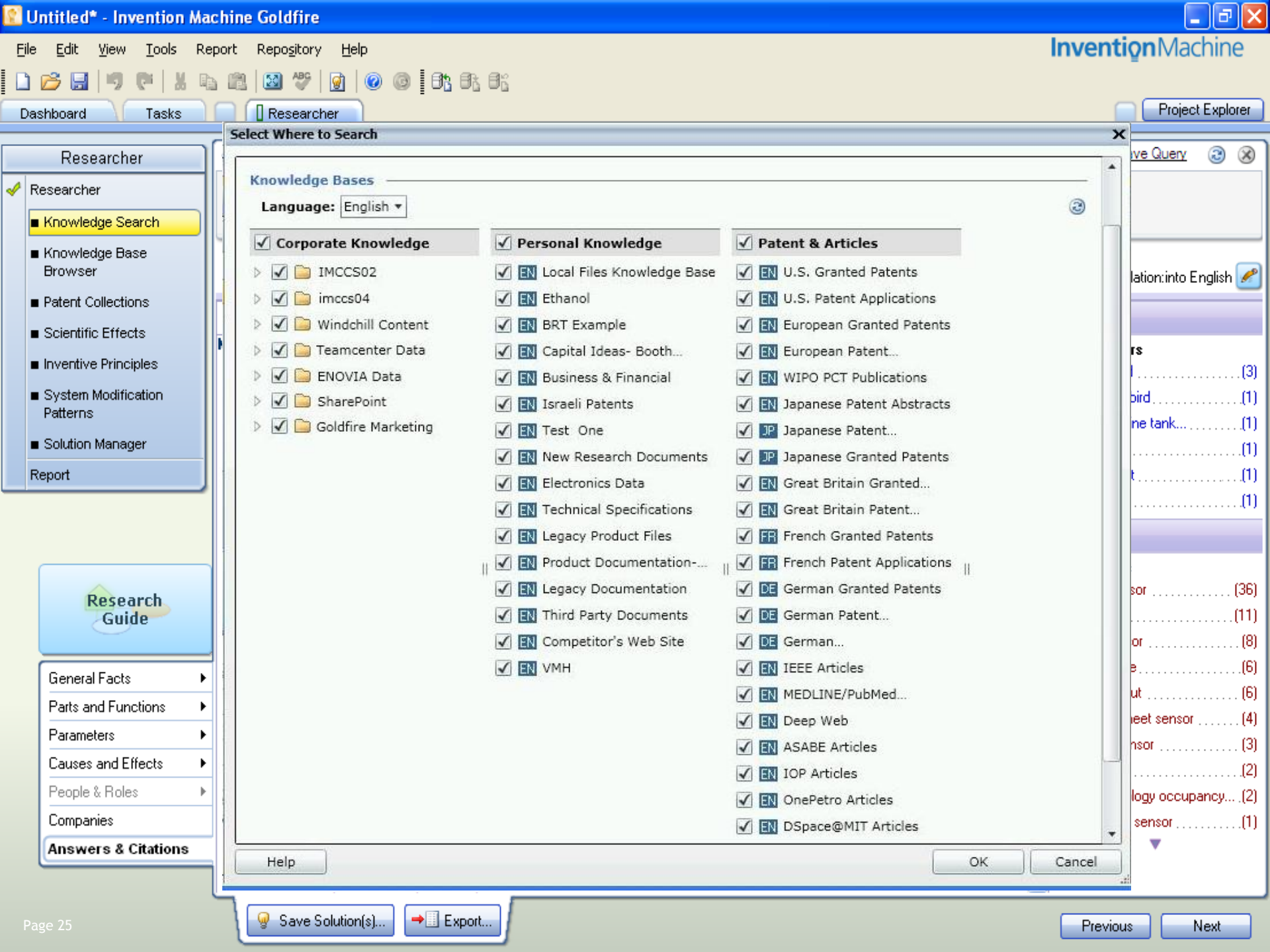
Photoelectric Sensor Overview
Photoelectric sensors represent perhaps the largest variety of problem solving choices in the industrial sensor market. Today 's photoelectric technology has advanced to the point where it is common to find a sensor that will detect a target less than 1 mm in diameter while other units have a sensing range up to 60 m. These factors make them extremely adaptable in an endless array of applications. Although many configurations are available including laser-based and fiber optic sensors, all photoelectric sensors consist of a few of basic components. Each
mitter, which is a light source such as an LED (light emitting diode) or laser diode, a
r phototransistor receiver to detect the light source, as well as the supporting electronics
mplify the signal relayed from the receiver.
m photoelectric sensors typically offer the longest sensing distance of photoelectric sensors.
units are available with a 25 m and more sensing range. Long range is especially common
eloped photoelectric sensors such as models containing a laser diode as the emitter. Laser
ed to increase sensing accuracy and detect smaller objects These units are capable of
well-collimated beam with little diffusion over the sensing ranges as long as 60 m. Even
ng distances, some through beam laser sensors are capable of detecting an object 3 mm in
le objects as small as .01 mm can be sensed at closer ranges. However, while precision
h laser sensors the speed of response for laser and non-laser through beam sensors
ain the same, around 500 Hz. An added bonus to through beam photoelectric sensors is
effectively sense an object in the presence of a reasonable amount of airborne
such as dirt. Yet these contaminants can falsely trigger the sensor if they build up on the
eiver. To prevent such false triggering from build up on the sensor face, some
s incorporate an alarm output into the sensor 's circuitry. This feature monitors the amount
g on the receiver. If the amount light decreases to a certain level without a target in place,
nds a warning out by means of a built in LED and/or an output wire.
r application of a through beam photoelectric sensor can be found is right in your home.
garage door opener has a through beam photoelectric sensor mounted near the floor,
dth of the door. This sensor is making sure nothing is in the path of the door when it is
re industrial application for a through beam photoelectric is detecting objects on a conveyor.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Windchill Content
Teamcenter Data
ENOVIA Data
SharePoint
Goldfire Marketing
Personal Knowledge
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Israeli Patents
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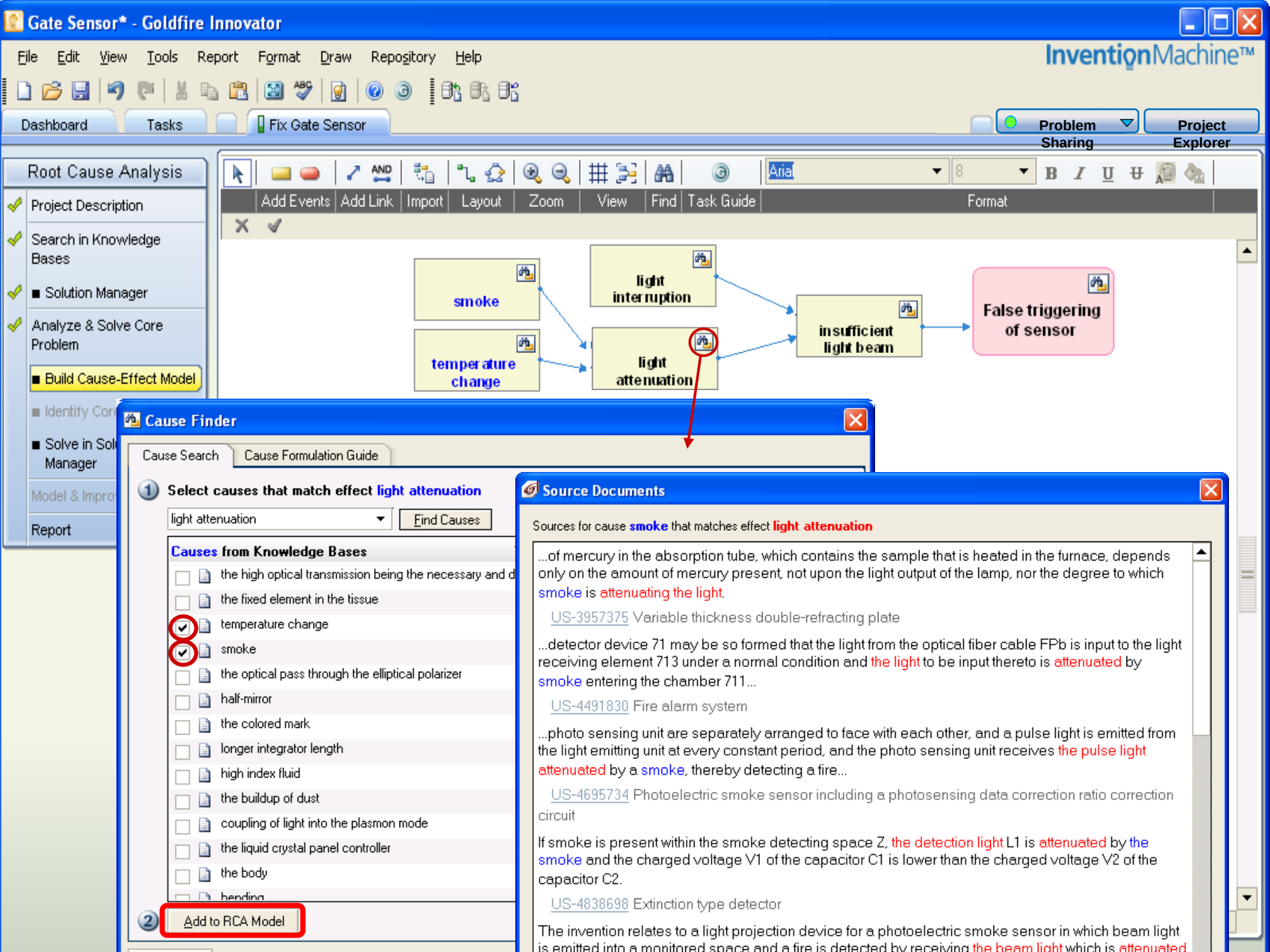
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Build Cause-Effect Model
Identify Core
Solve in Solution Manager
Model & Improve
Report
Add Events
Add Link
Import
Layout
Zoom
View
Find
Task Guide
Format
smoke
temperature change
light interruption
light attenuation
insufficient light beam
False triggering of sensor
Cause Finder
Cause Search
Cause Formulation Guide
1 Select causes that match effect light attenuation
light attenuation
Find Causes
Causes from Knowledge Bases
the high optical transmission being the necessary and d
the fixed element in the tissue
temperature change
smoke
the optical pass through the elliptical polarizer
half-mirror
the colored mark
longer integrator length
high index fluid
the buildup of dust
coupling of light into the plasmon mode
the liquid crystal panel controller
the body
bending
2 Add to RCA Model
Source Documents
Sources for cause smoke that matches effect light attenuation
...of mercury in the absorption tube, which contains the sample that is heated in the furnace, depends only on the amount of mercury present, not upon the light output of the lamp, nor the degree to which smoke is attenuating the light.
US-3957375 Variable thickness double-refracting plate
...detector device 71 may be so formed that the light from the optical fiber cable FPb is input to the light receiving element 713 under a normal condition and the light to be input thereto is attenuated by smoke entering the chamber 711...
US-4491830 Fire alarm system
...photo sensing unit are separately arranged to face with each other, and a pulse light is emitted from the light emitting unit at every constant period, and the photo sensing unit receives the pulse light attenuated by a smoke, thereby detecting a fire...
US-4695734 Photoelectric smoke sensor including a photosensing data correction ratio correction circuit
If smoke is present within the smoke detecting space Z, the detection light L1 is attenuated by the smoke and the charged voltage V1 of the capacitor C1 is lower than the charged voltage V2 of the capacitor C2.
US-4838698 Extinction type detector
The invention relates to a light projection device for a photoelectric smoke sensor in which beam light

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InventionMachine

Dashboard | Tasks | Fix Gate Sensor | Problem Sharing | Project Explorer

Root Cause Analysis

- Project Description
- Root Cause Analysis
- Build Cause-Effect Model
- Identify Core Problems
- Solve in Solution Manager
- Report

Problems and Solutions | View

**Problems & Solutions:**

- Core problems
  - False triggering of sensor
    - Addtional logic circuitry
    - Use of fiber optics
  - foreign light source
  - light attenuation
    - elimination of scattering of light
    - polishing of surface of window
    - suppression of absorption of light
    - reflective film
    - 3 - Local quality
    - Coordination:: dynamism

Rank Solutions...

**Problem description:**

In order to eliminate the following undesirable event False triggering of sensor, eliminate event light attenuation.
How to prevent light attenuation?

Subsystem to rank potential solutions

Libraries to stimulate creative ideas

**Solutions:**

Knowledge Search | Effects | Principles | Patterns | User-defined

Query: How to prevent the light attenuation? Find English Translation: into English Advanced Stop Refresh

**Corporate Knowledge** 97 related results

**Patents & Articles** 426 relevant results

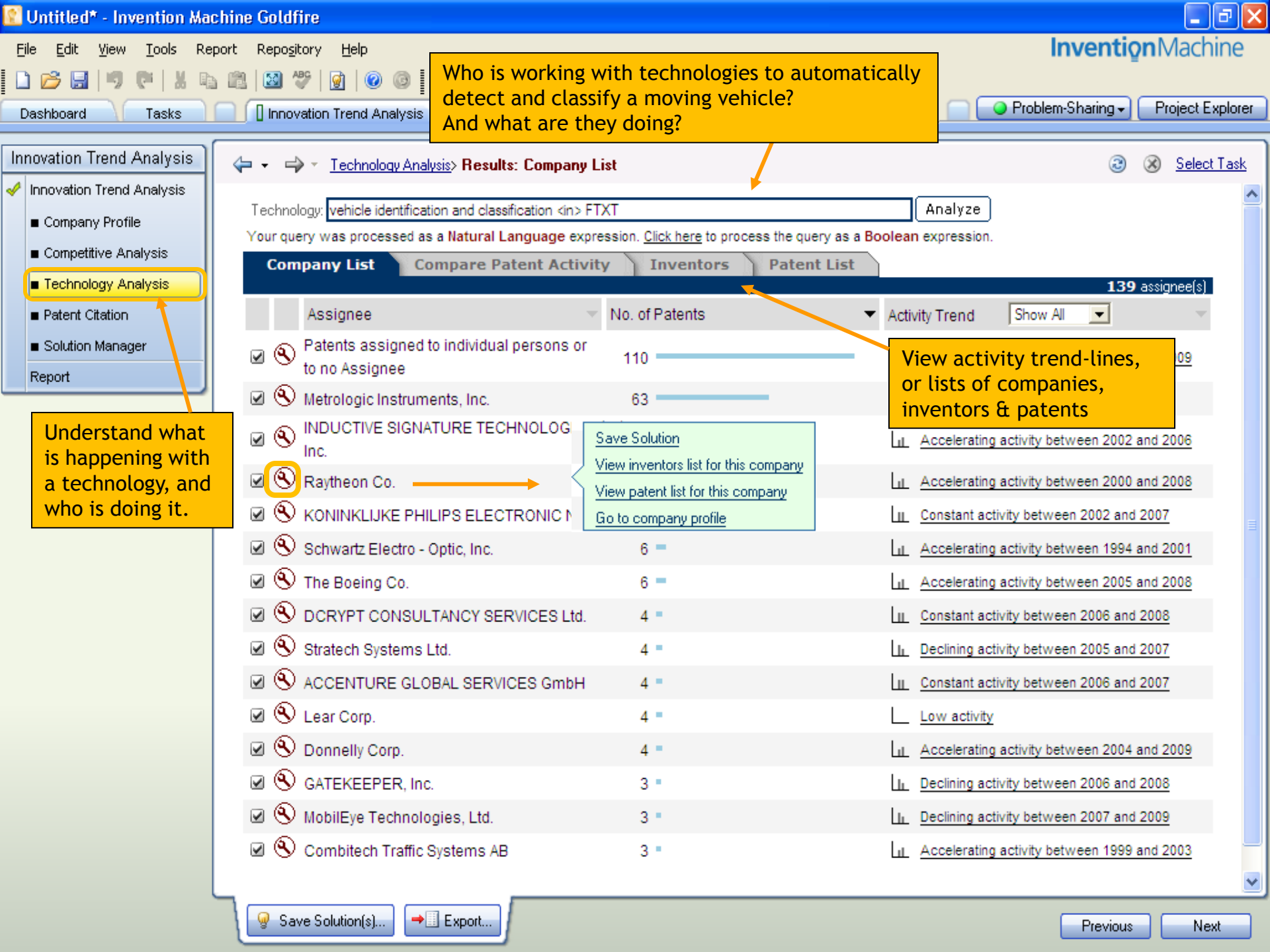
Knowledge sources automatically searched to find potential solutions

**Most relevant:**

1. **laminate portion contained by whole of substrate**
   (e) Al.sub.2 O.sub.3 is evaporated on the **whole of** the **substrate** (1) **containing** the **laminate portion** in order to prevent the **attenuation** of **light**.
   US-4866406 Wide-band optical modulator
2. **smooth surface of window**
   To prevent **attenuation** of the transmitted **light** beam by scattering, both **surfaces of** the **window** 170 should be **smooth**, and preferably have a peak to peak RMS roughness, i.e., the vertical distance between the peaks and valleys of the

Save Solution(s)...

Previous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Dashboard Tasks Innovation Trend Analysis
Problem-Sharing Project Explorer
Who is working with technologies to automatically detect and classify a moving vehicle? And what are they doing?
Innovation Trend Analysis
Innovation Trend Analysis
Company Profile
Competitive Analysis
Technology Analysis
Patent Citation
Solution Manager
Report
Technology Analysis> Results: Company List
Select Task
Technology: vehicle identification and classification <in> FTXT
Analyze
Your query was processed as a Natural Language expression. Click here to process the query as a Boolean expression.
Company List
Compare Patent Activity
Inventors
Patent List
139 assignee(s)
Assignee
No. of Patents
Activity Trend
Show All
Patents assigned to individual persons or to no Assignee 110
Metrologic Instruments, Inc. 63
INDUCTIVE SIGNATURE TECHNOLOG Inc.
Raytheon Co.
KONINKLIJKE PHILIPS ELECTRONIC N
Schwartz Electro - Optic, Inc. 6
The Boeing Co. 6
DCRYPT CONSULTANCY SERVICES Ltd. 4
Stratech Systems Ltd. 4
ACCENTURE GLOBAL SERVICES GmbH 4
Lear Corp. 4
Donnelly Corp. 4
GATEKEEPER, Inc. 3
MobilEye Technologies, Ltd. 3
Combitech Traffic Systems AB 3
Save Solution
View inventors list for this company
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Accelerating activity between 2002 and 2006
Accelerating activity between 2000 and 2008
Constant activity between 2002 and 2007
Accelerating activity between 1994 and 2001
Accelerating activity between 2005 and 2008
Constant activity between 2006 and 2008
Declining activity between 2005 and 2007
Constant activity between 2006 and 2007
Low activity
Accelerating activity between 2004 and 2009
Declining activity between 2006 and 2008
Declining activity between 2007 and 2009
Accelerating activity between 1999 and 2003
View activity trend-lines, or lists of companies, inventors & patents
Understand what is happening with a technology, and who is doing it.
Save Solution(s)...
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InventionMachine

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Innovation Trend Analysis

- Innovation Trend Analysis
- Company Profile

Technology Analysis> **Results: Patent List** Select Task

Technology: vehicle identification and classification <in> FTXT Analyze

Company: Raytheon Co

## Goldfire - Patent Citation

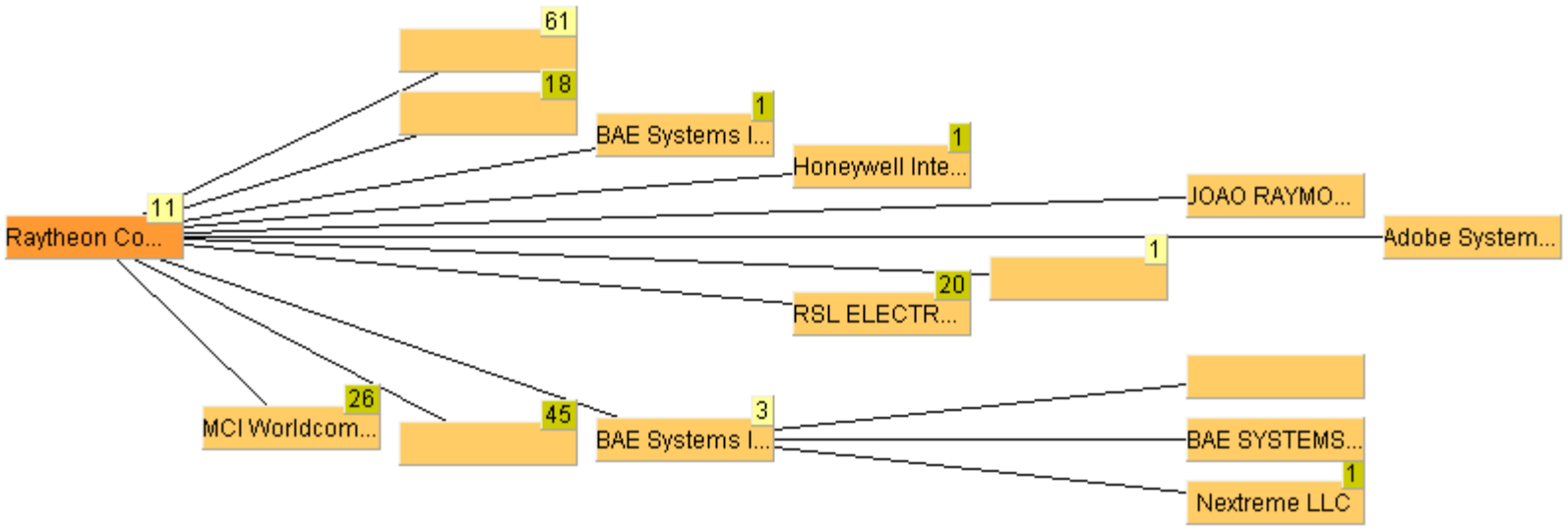
US-6014447 Passive vehicle classification using low frequency electro- magnetic emanations

Raytheon Company

Graph | Table

Citation: Backward Forward | Show: Assignee | Show year distribution | Original Size Fit to screen

2000 2002 2003 2005 2006 2007 2008 2009

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# Invention Machine

- A leading innovation software provider with hundreds of customers in more than 25 countries.
- Based in Boston, with offices in six countries and a global network of distributors and partners

# Questions & Answers

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**Questions?**