Science Fiction as a Provider of Guiding Images for Innovation

Dr. Karlheinz Steinmüller

Foresight – between science and fiction
3rd annual iFQ conference 2008
December 11th-12th 2008
Overview

- Introduction
- Case Study: Space Flight
- Uses of Science Fiction for Foresight
- Conclusion
A History of Predicted Innovations

1865  Jules Verne:  
**Moon flight**

1880  Albert Robida:  
**Telephot** (picture phone)

1911  Hugo Gernsback:  
**Solar energy**  
**Automatic translation**

1912  H. G. Wells:  
**Atomic bomb**

1919  Friedrich Freksa:  
**Data suit / Virtual reality**

1923  Karel Čapek:  
**Robots**

Science fiction writers – as good a “hit rate” as expert forecasters?

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Utopia Turned Into Reality ...

... but not as we expected it.

Pocket phone

Electronic mail

Personal computers
The Place of Science Fiction

Fiction

Mimetic ("realistic") fiction
Non-mimetic ("fantastic") fiction

Fantasy, horror, weird fiction
Science Fiction

Adventure SF
Cognition-related SF

Deviation from reality: The “novum”

Legitimated by: Science & technology
Two Kinds of Science Fiction

Extrapolative SF
- Science based forecasts
- Technological feasibility
- Near future
- Scientific accuracy

Speculative SF
- Philosophical orientation
- Visionary imagination
- Far implications of progress
- Socio-cultural orientation

"We do not proceed in the same manner. It occurs to me that his stories do not repose on very scientific bases. No, there is no rapport between his work and mine. I make use of physics. He invents. I go to the moon in a cannon-ball, discharged from a cannon. Here there is no invention. He goes to Mars [sic!] in an airship, which he constructs of a metal which does away with the law of gravitation. Ça, c'est très joli," cried Monsieur Verne in an animated way, "but show me this metal. Let him produce it."  
(Interview with Jules Verne in T.P.'s Weekly, October 9, 1903)
Science Fiction as a Quasi-Scientific Enterprise

SF performs thought experiments
• starting question: “What if...?”
• sometimes well researched
• search for (dramatic) consequences

SF is a collective enterprise
• writers develop concepts introduced by other writers
• writers use a common vocabulary of technical terms

SF has experienced phases
• of rather accumulative growth
• and paradigm shifts
Possible Uses of Science Fiction in Foresight

Basic hypothesis:
SF writers take early hold of emerging scientific and technological ideas and their social implications.

Uses of SF
Pool of inspirations
• for innovation processes
• for wild cards ...
Early warning system
• for weak signals
Means of popularization of ideas
→ SF as a factor shaping the future!

Science fiction as mirror and provider of guiding images

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Case Study: Early Spaceflight Visionaries

Pioneers (ca. 1900 – 1930)
- K. E. Tsiolkovsky
- H. Oberth
- R. H. Goddard

Common characteristics
- Technical foundations
- Utopian visions
- Contacts with / use of science fiction

Public perception
- Crackpots
- Pure fantasy

Willy Ley 1928
### Konstantin E. Tsiolkovsky (1857-1935)

**Science Fiction**
- 1893   On the Moon
- 1895   Dreams about Earth and Sky
- 1920   Out of Earth

"But I was also attracted to science fiction. Many times I essayed the task of writing about space travel but wound up by becoming involved in exact compilations and switching to serious work. Science fiction stories on interplanetary travel carry new ideas to the masses."

*(Is this mere fantasy?, in: Komsomolskaya Pravda, July 23, 1935; quoted from *The Call of the Cosmos*, Moscow 1960, p. 470)*

(1895 / German transl. 1956)
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Arthur C. Clarke (1917 - 2008)

1945  "Extraterrestrial Relays" (Wireless World, 10/45)
1946/47, 1950-53 President of British Interplanetary Society

Early Non-fiction
1950  Interplanetary Flight
1951  The Exploration of Space
1954  The Exploration of the Moon
1957  The Making of a Moon
1962  Profiles of the Future

Early SF
1948  Against the Fall of Night
1950  Childhood's End
1951  Prelude to Space
1951  The Sands of Mars
1952  Islands in the Sky
1953  Expedition to Earth (coll., with "The Sentinel")

EXTRA-TERRESTRIAL RELAYS

Can Rocket Stations Give World-wide Radio Coverage?

Although it is possible, by a suitable choice of frequencies and routes, to provide telephony circuits between any two points or regions of the earth for a large part of the time, long-distance communication is greatly hampered by the peculiarities of the atmosphere, and there are even occasions when it may be impossible. A true broadcast service, giving constant fold strength at all times over the whole globe would be invaluable, not to say indispensable, in a world society.

Unquestionably, though the telephony and telegraph position is that of television is far worse, since atmospheric transmission cannot be employed at all. The service area of a television station, even on a very good site, is only about a hundred miles across. To cover a small country such as Great Britain would require a network of transmitters, connected by microwave relay links. A recent theoretical study has shown that such a system would require repeaters at intervals of fifty miles or less. A system of this kind could provide the basis for an extra-terrestrial radio relay system.

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# Space Flight and Science Fiction

<table>
<thead>
<tr>
<th>Stage</th>
<th>Space Flight</th>
<th>Science Fiction</th>
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<tbody>
<tr>
<td>Age of Visionaries</td>
<td>Space flight theoretically possible Technical principles known since Tsiolkowsky, Oberth, Goddard</td>
<td>Early space fiction: - (satirical) space utopias - popularization of Copernican world view Space flight technically feasible (Verne)</td>
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<tr>
<td>Age of Rocket Pioneers</td>
<td>Exaggerated hopes Limitations of technology and costs of realization not yet experienced Scientific community still hostile</td>
<td>SF promotes <em>guiding image</em> of “space flight by jet propulsion” Recruitment of young space scientists/rocket technicians SF as popular science - popularization of aims and means - fund raising - touchstone: scientific accuracy</td>
</tr>
<tr>
<td>Space Age</td>
<td>Business as usual space flight beyond original fields of use Expenses and limitations known</td>
<td>Growing gulf between SF &amp; space flight: - SF goes literary, loses interest in space flight tech. - experts pushed back by lack of sci. accuracy in SF SF as a means of public relations</td>
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"Astronautics is the only science that can be said to have been not just shaped, but kept alive, by writers and artists."  
(Randy Liebermann)

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Science Fiction – Provider of Guiding Images

Guiding:
• collective projections
• synchronous pre-adaptation
• functional equivalent

Imagining:
• cognitive activator
• individual mobilisator
• interpersonal stabilisator


John Grin:
„The question is not whether it is possible to shape the future according to some shared vision, but rather whether it is possible to shape the visions that are guiding us into ones we like better.“ (p. 11)
The Other Side of SF Guiding Images

Persistent Images:
- Fly-Car
- Picture Phone
- Household Robot
- Teleportation
- Warp Drive
- ...

→ Wishful, but unrealistic
→ Worn, but loved stereotypes!

But how to draw the demarcation line?
Overview

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Uses of Science Fiction for Foresight

Uses of Science Fiction

- Motivation & inspiration
- Idea pool for innovation
- Mind opener: Wild cards
- Early warning system: Weak signals
- Model for narrative scenarios

Frederick Pohl:
“A good science fiction story should be able to predict not the automobile but the traffic jam.”

(Lambourne / Shallis / Shortland: Close Encounters? Science and Science Fiction, Bristol and New York 1990, p. 27)

→ Science Fiction adds:
  - social contexts
  - human behavior

How to systematically use inspiration from science fiction?
Innovative Technologies From Science Fiction

Some ideas from SF

• Intake of food through the skin
• Neuro enhancement
• Orbital lifts
• Solar satellites
• Instantaneous communication by means of quantum entanglement
• Nano architecture
• Asteroid mining

“We got the communicator. When does the beam chamber arrive?”

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Wild Cards From Science Fiction

A wild card
“... is a future development or event with a relatively low probability of occurrence but a likely high impact on the conduct of business”
(BIPE Conseil, Institute for the Future, Copenhagen Institute for Futures Studies 1992, p. v)

→ Surprising character (“next big thing”)

• Where to look?
• How to overstep a perhaps too narrow horizon?
• Does it make sense to look for implausible or impossible wild cards?
• How to communicate them?

→ Thinking the Unthinkable!
→ Use Science Fiction!

“This is a good idea – but is it crazy enough?”

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Wild Cards From Science Fiction

Some topics:

• Asteroid impact
• New Ice Age
• Life span 150
• Pandemic
• Robots claiming human rights
• Self-replicating nano-bots running wild (“Grey goo”)
• Zero point energy
• …
Weak Signals From Science Fiction?

Michel Godet: A weak signal is “… a factor of change which is now barely perceptible but will make up tomorrow’s heavy or mega-trends.”

Science fiction as source of weak signals
Tremendous range of
- issues & topics
- perceptions & interpretations
Assessment of relevance?
- What ideas are indicators for what issue?

“3S” of Weak Signals Management:
- How to develop sensitivity?
- How to balance sensitivity vs. selectivity?
- How to organize serendipity?
Weak Signals from Science Fiction?

Some topics:
- Transhumanist visions of all kinds
  - Birth of a new human race within the old
  - Cyborgization of man
  - New genders ...
- New cults of irrationality

Some trends:
- Alternative history novels
- Space operas & “military SF”
- Millennial Fantasy
- Multicultural SF
Selecting Science Fiction

What to select for a study?

• “Hard SF” (“tech porn”)
• “Soft SF” (“social SF”)
• “Trash SF” (“sci-fi schlock”)
• Dystopias?
• Comedies?

→ Ideas pop up everywhere!

Albert Robida, ca. 1880
„La Maison Machinée“
Surveillance technology in the living room
Overview

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### Science Fiction vs. Foresight

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<tr>
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<th>Science Fiction</th>
<th>Foresight</th>
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<tbody>
<tr>
<td><strong>Aim</strong></td>
<td>• entertainment</td>
<td>• decision making</td>
</tr>
<tr>
<td><strong>Approach</strong></td>
<td>• intuitive &amp; creative</td>
<td>• methodological</td>
</tr>
<tr>
<td></td>
<td>• (but also with method)</td>
<td>• (but also with creativity)</td>
</tr>
<tr>
<td><strong>Guiding questions</strong></td>
<td>• What is imaginable?</td>
<td>• What is possible / feasible?</td>
</tr>
<tr>
<td></td>
<td>• What is the most surprising, striking, terrific that can happen?</td>
<td>• What are plausible impacts?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• What is desirable?</td>
</tr>
<tr>
<td><strong>Quality criteria</strong></td>
<td>• originality</td>
<td>• plausibility, realism</td>
</tr>
<tr>
<td></td>
<td>• strength of imagination</td>
<td>• methodological</td>
</tr>
<tr>
<td></td>
<td>• narrative (dramatic) quality</td>
<td>• transparency (e. g. explicit value statements)</td>
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Has SF the more realistic perception of man and society?
Conclusion: Some Limitations

Foresight (often)
- too much “realism”
- lack of imagination
- abstract character

Science Fiction (often)
- combines new technology with old social patterns
- “overdoes it”: sacrifices everything for the sake of a good story

The Future remains a *terra incognita*. 
"The only way of discovering the limits of the possible is to venture a little way past them into the impossible."

Arthur C. Clarke
Thank you for your attention!

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