A Relational Process View of Information Systems

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Aim:

Open thinking in Information Systems to the value of relational process ontology (strong view)

key ontological questions:

What is an IS?

What is an IS for?

How do components make up an IS?

How does an IS become?

Current state of understanding IS: Definitions

e.g.

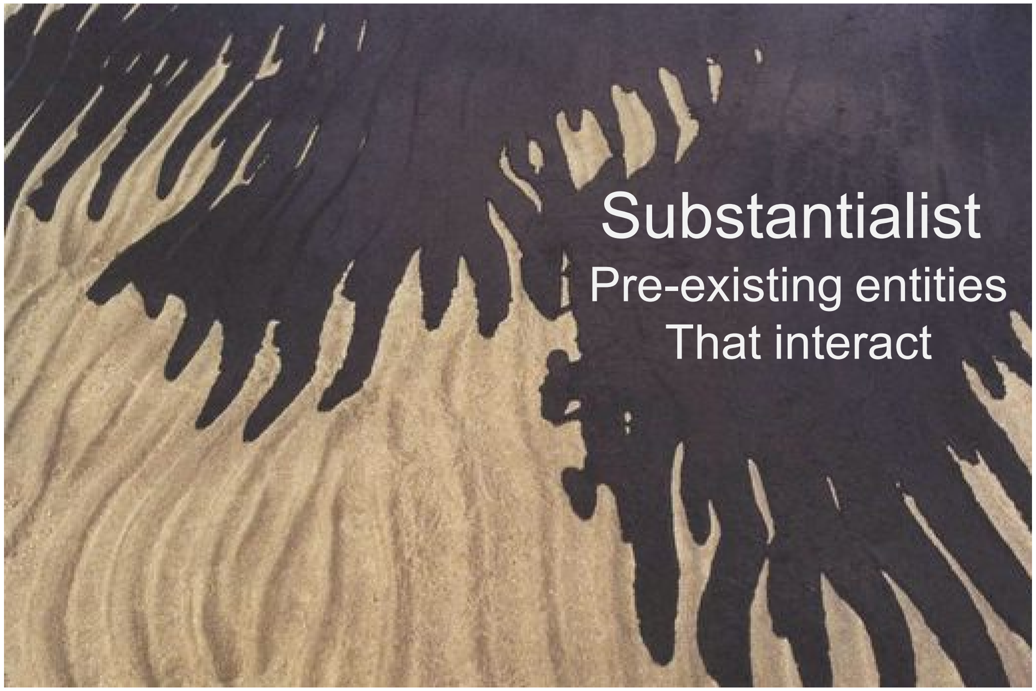
"Information systems are *not* technical systems which have behavioural and social consequences, rather they are *social systems* which rely to an increasing extent on information technology for their function. Nevertheless, the technology is never more than a component of the information system."
(Land and Hirschheim 1983, p. 91, emphasis in original)

Social actors

Information technology IT

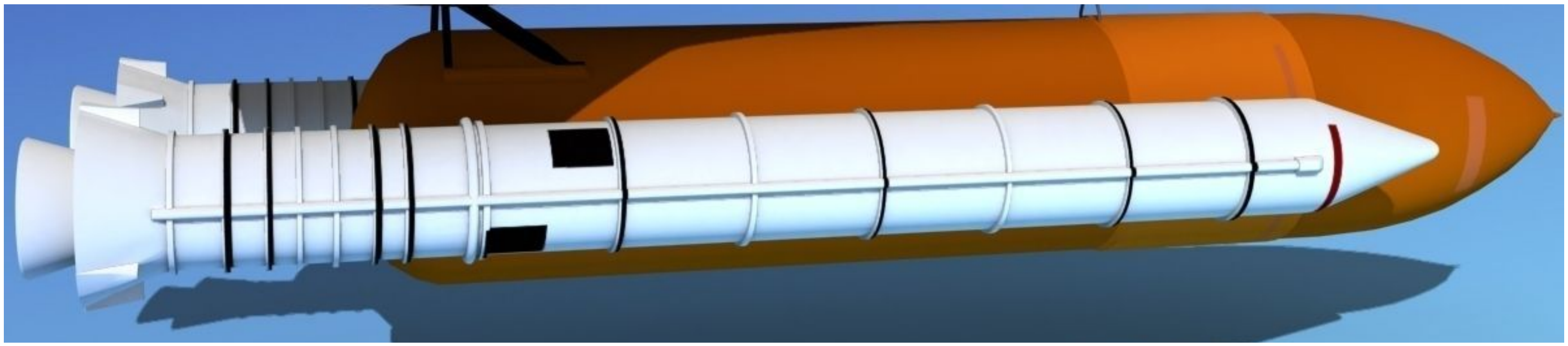
7 'Components' of IS evoked in definitions

- Information technology or IT artifacts
- Social actors
- Data
- Information
- Activities
- Organizing contexts
- Modelling

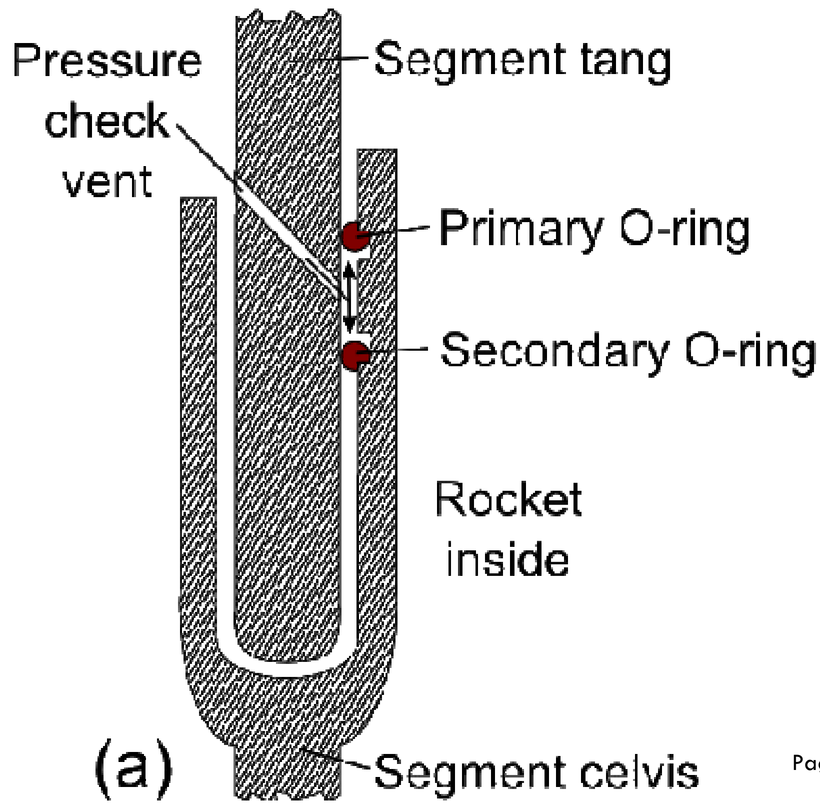



USA
NASA

Solid Rocket Booster (SRB)



- Reusable
- Dismantled for transportation
- 3 field joints
- Avoid leaking hot combustion gases
- Check seal



Events 27-28 January 1986

Cold weather forecast probed inquiry at the Marshall Space Flight Centre (MSFC)

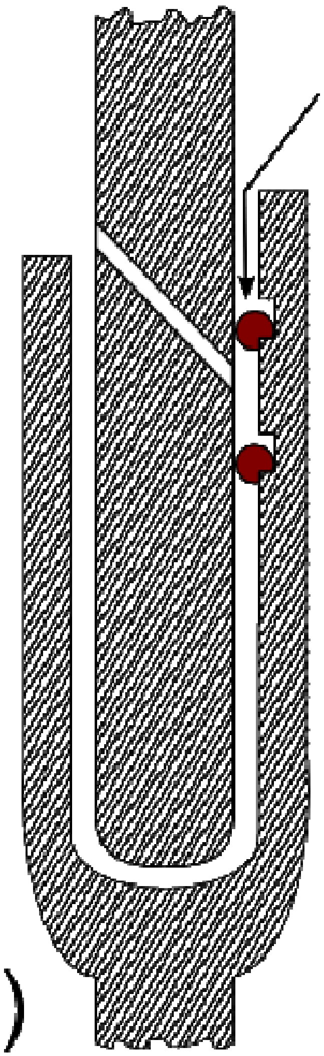
"all of the [Materials] Division's tests were at ambient temperature or above. No low-temperature testing had been done on their division because of the agencywide [sic] assumption that the materials would be called upon to withstand extremes of heat at ignition and warm Florida temperatures, not cold."
(Bill Riehl, the chief of the Nonmetallic Materials Division)

"It would have been a little harder, there's no question about that. I mean, there's data all over the world to show that it would have been a little less resilient and a little harder. But at those pressures [200psi used to test seals], it would have sealed." (John Schell, Material Laboratory)

Involvement of Morton Thiokol industries (MTI)

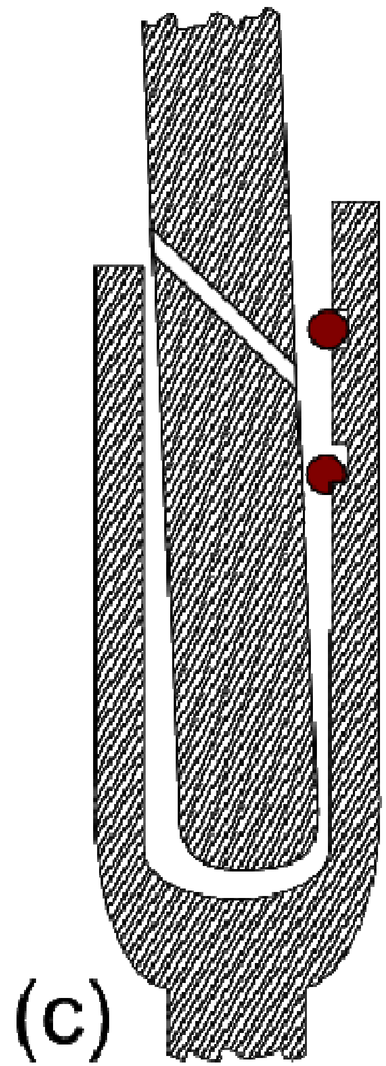
"We had done tests at 100 degrees [Fahrenheit], 75 degrees, and 50 degrees and had seen that the O-ring became much more sluggish to respond to receding metal surfaces at 50 degrees and the fact that we were expecting temperatures much colder than that gave us concern." (Brian Russell - Special Projects Manager)

"the leak check forces the primary O-ring into the wrong side of the groove [Figure 2b], while the secondary O-ring is place [sic] in the right side of the groove […] we should consider this in our evaluation of what is the lowest temperature we can operate in."
(Allan McDonald, Director of SRM Projects)



(b)

Joint Rotation



HISTORY OF O-RING TEMPERATURES (DEGREES - F)

	MOTOR	MBT	AMB	O-RING	WIND
SRB tests data	DM-4	68	36	47	10 MPH
	DM-2	76	45	52	10 MPH
	QM-3	72.5	40	48	10 MPH
	QM-4	76	48	51	10 MPH
Earlier missions	SRM-15	52	64	53	10 MPH
	SRM-22	77	78	75	10 MPH
prediction	SRM-25	55	26	29 27	10 MPH 25 MPH

"I recognized that it was not a strong technical position […] because our whole position was based on the performance of [STS-51C] […] And so it began, to my way of thinking, to really weaken our conclusions and recommendations."
(William Macbeth, Space Booster Project Engineering)

"We had blow-by on the hottest motor and on the coldest motor. So it was not conclusive to me just how bad the blow-by erosion would be on a cold motor."
(Donald Ketner, Gas Dynamics and Seal Task Force)

"Temperature data not conclusive on predicting primary O-ring blow-by"

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e.g.

MTI engineers - became different actors, as illustrated by the infamous instruction by Jerald Mason to Robert Lund:

“Take off your engineering hat and put on your management hat”

Theory

– Agential Realism – intra-action (Barad 2007)

  IS components can be understood as relational, emergent, and continuously and dynamically co-constructed through mutual intra-acting while simultaneously performing the IS.

  “"We [MTI engineers] have dealt with Marshall for a long time and have **always been in the position of defending our position to make sure that we were ready to fly,** and I guess I didn’t realize until after that meeting [evening of 27 Jan] and after several days that we had absolutely changed our position from what we had been before. But that evening I guess I had never had those kinds of things come from the people at Marshall that **we had to prove to them that we weren't ready."** (Robert Lund, Presidential Commission Report 1986a:811)

– “Dynamic Sameness” (Seibt 2012)

Discussion

	Traditional view (grounded in substantialist metaphysics)	Relational Process view (grounded in process philosophy)
– What is an IS?	An IS is a self-contained stable entity that interacts with an organization (an entity itself) it serves.	an IS is a temporal relational accomplishment of intra-acting components.
– What is an IS for?	An IS represents (maps) reality so that information (processed data) helps users monitor, predict, and control organizational processes.	an IS does not just 'represent' reality, it also actively participates in meaning-making and reality (re)construction and (re)configuration.
– How do components make up an IS?	Components are self-contained stable entities, defined by their properties; components interact to make up an IS and realize its function	Components are continuously unfolding through intra-actions and thus creating different configurations that construct an IS while at the same time mutually co-constructing each other.
– How does an IS become?	IS as an artifact is designed and developed to meet the needs of users; an IS persists as an entity with given properties and functions until it is abandoned.	An IS is in a continuous process of becoming through temporal unfoldings; an IS comes into existence or ceases to exist through relations and continuously unfolds as part of wider processes and organizing flux.

Contribution

1. demonstrate how different components mentioned in definitions of IS are not given and stable entities, but are always becoming through mutual intra-acting;
2. show how IS themselves are constantly emerging—as part of the wider organizing processes they serve—created and recreated through relations among the components;
3. propose a relational-processual view of IS as temporal relational accomplishments of dynamic processes of intra-acting among different components.