2017 issue

TOPICS Schadenspiegel

Topic:
The future of claims management

Anniversary edition
60 years of Schadenspiegel

NOT IF, BUT HOW

Munich RE

This map shows journeys made by a single person in Portland between 2008 and 2012. The map was generated from GPS logs gathered by geoloqi.com and run through a custom script that projects the GPS logs onto a 2D image plane. There is approximately one GPS point recorded every 2–6 seconds when a person is moving.

Dear Reader,

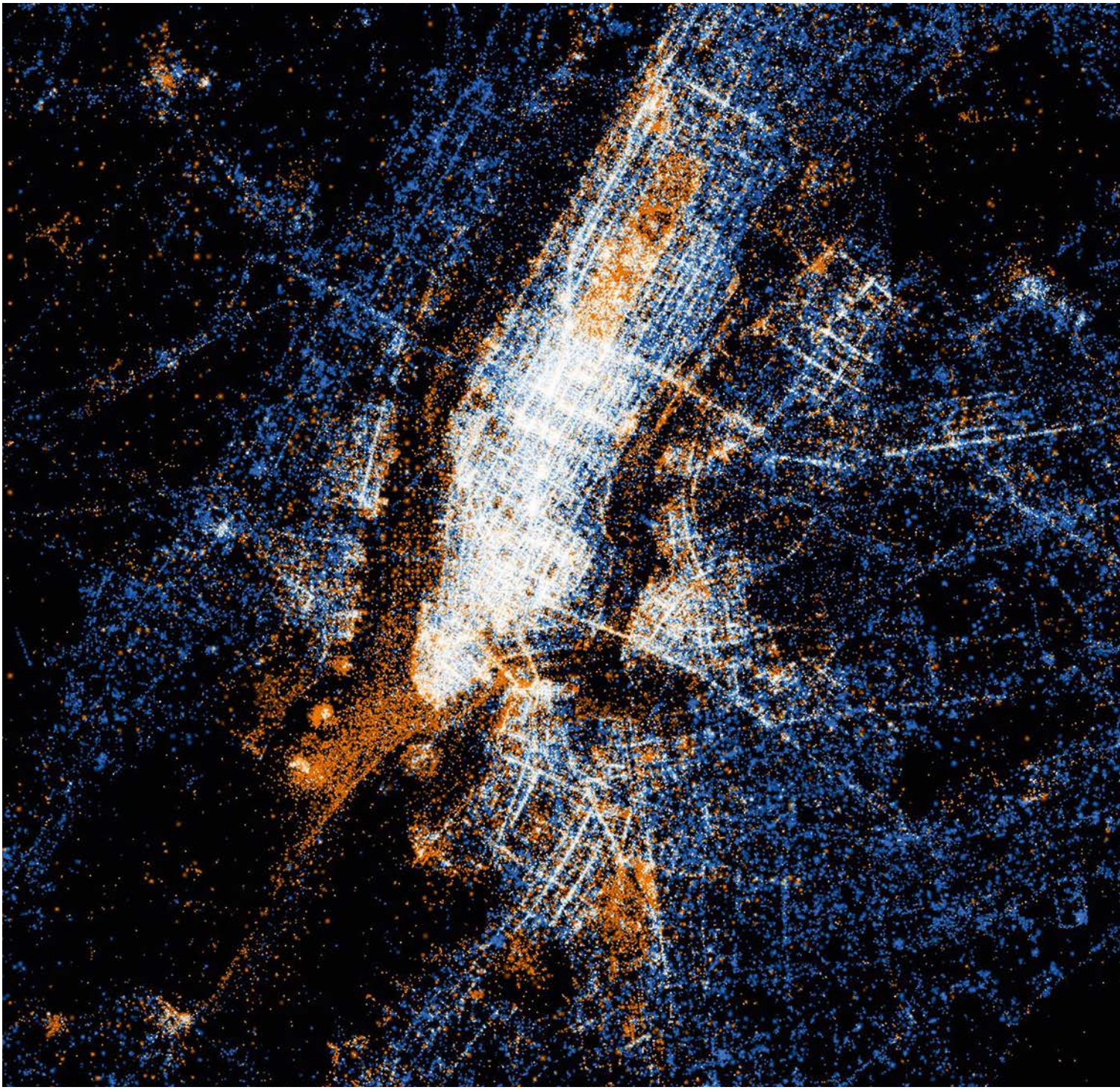
Schadenspiegel is now 60 years old. A lot of changes have taken place since this magazine was first published, especially regarding the type of losses the insurance industry has to deal with and how it handles claims management. But Schadenspiegel has also moved with the times. While the early years were dominated by reports on fire and industrial claims, today's articles are as likely to deal with natural disasters or liability losses.

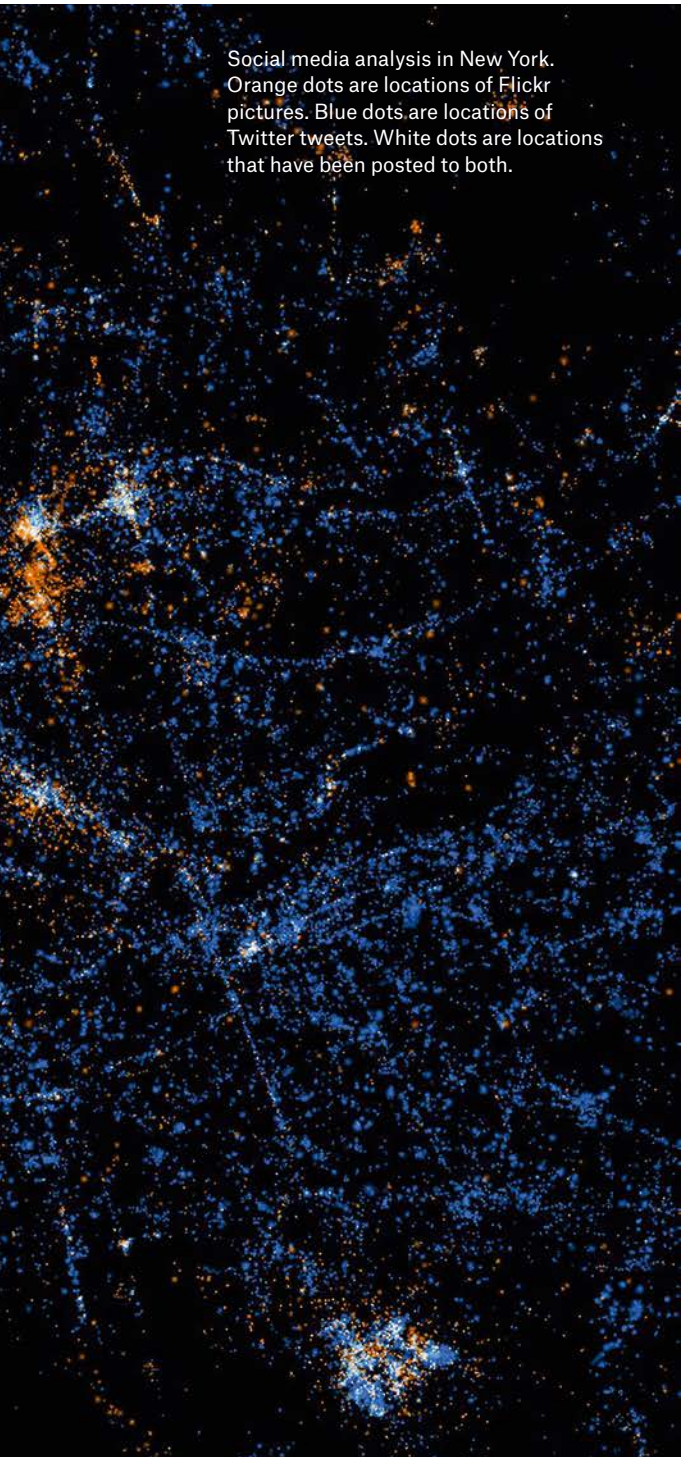
We are using the Schadenspiegel anniversary as an opportunity to look back at the early days of the publication, at how its objectives have changed and at some of the losses that proved groundbreaking in the development of claims management. At the same time, we also look to the future and examine developments that will shape the ongoing change to digital claims management. We look at the risks and opportunities presented by big data and artificial intelligence, and examine new claims analysis technologies. The topics covered in this issue range from automated claims processing after natural disasters to the development of new coverage concepts in agriculture using satellite data and images to determine crop losses.

But as the hurricanes this year clearly illustrated, we still have to deal with traditional types of claims and risks – even in this digitalised age. So the second part of this issue of Schadenspiegel is devoted to topics from these areas: loss minimisation measures following damage to power plants, coverage issues with art theft insurance, and liability risks in the construction and health sectors.

We hope you enjoy reading this anniversary issue of Topics Schadenspiegel.

Tobias Büttner
Head of Claims at Munich Re





Social media analysis in New York. Orange dots are locations of Flickr pictures. Blue dots are locations of Twitter tweets. White dots are locations that have been posted to both.

The growing digitalisation of all aspects of our lives is set to radically change the world of claims management. Tobias Büttner, Head of Claims, and David Feghelm, Senior Solutions Manager in Claims, discuss how insurers will soon be using digital technology to manage losses.

Managing major losses digitally

Tobias Büttner Claims management in particular is an area that will benefit enormously from new technologies, most of all from digitalisation. InsurTech start-ups such as Lemonade in the USA have already demonstrated that fully automated claims handling of mass business using artificial intelligence is no longer just a vision. But also the management of very large losses will increasingly build on the use of new technology.

David Feghelm Intelligent image recognition is becoming more and more relevant for (re)insurers in the management of major losses such as natural disasters. Automated evaluation of satellite images and aerial photographs using algorithms provides a rapid overview and accurate estimate of what losses have occurred where. Resources such as loss adjusters and on-site appraisals can then be deployed more efficiently, cutting both costs and claims processing times. In an ideal scenario, once you combine the information obtained in this way with portfolio data (insured risks and their location), you can quickly make a remote estimate of the loss amount in your own portfolio. The main challenge here is data quality, particularly in terms of the geocoding of risks and adjusting algorithms for claims classification purposes.

Büttner With complex major losses, it is vital to have very large amounts of relevant data in sufficient quality. In this context, I can see major benefits for everyone involved, in that subjective assumptions and gut feelings will be replaced by decisions based on concrete data. However, loss data needs to be complemented by data on exposure and policies, with unrestricted linkability between the data sources wherever admissible.

Feghelm Where legally permissible, a central ● data lake enables enormous amounts of data to be stored and linked together. In this way, risk and claims data can be enriched with relevant aspects, knowledge gaps closed, and a holistic understanding established. Using modern data analytics, relevant information for claims management purposes will be made available quickly, easily and in a targeted manner. Claims trends will be recognised earlier and claims benchmarks generated. With the help of ● predictive analytics, algorithms will be able to forecast claims amounts much more precisely. This will enable us to detect major losses with unusual run-off patterns more quickly. Providing our clients with this data will bring prompt agreement with the policyholder and increase customer satisfaction, while at the same time minimising the risk that a claim may turn out to be larger than expected. Underwriting will also benefit if the acquired data can be processed in such a way as to derive long-term findings on risk selection and pricing.

● A data lake is a method of storing data within a system or repository, in its natural format, that facilitates the collocation of data in various schemata and structural forms, usually object blobs or files.

● Predictive analytics encompasses a variety of statistical techniques from predictive modelling, machine learning, and data mining that analyse current and historical facts to make predictions about future or otherwise unknown events.

● Text mining, also referred to as text data mining, roughly equivalent to text analytics, is the process of deriving high-quality information from text.

Büttner Another major challenge will be making available processed and collated information from claims files, claims reports and other unstructured sources. As far as possible, unstructured information will be converted into structured data to make it usable for data analyses.

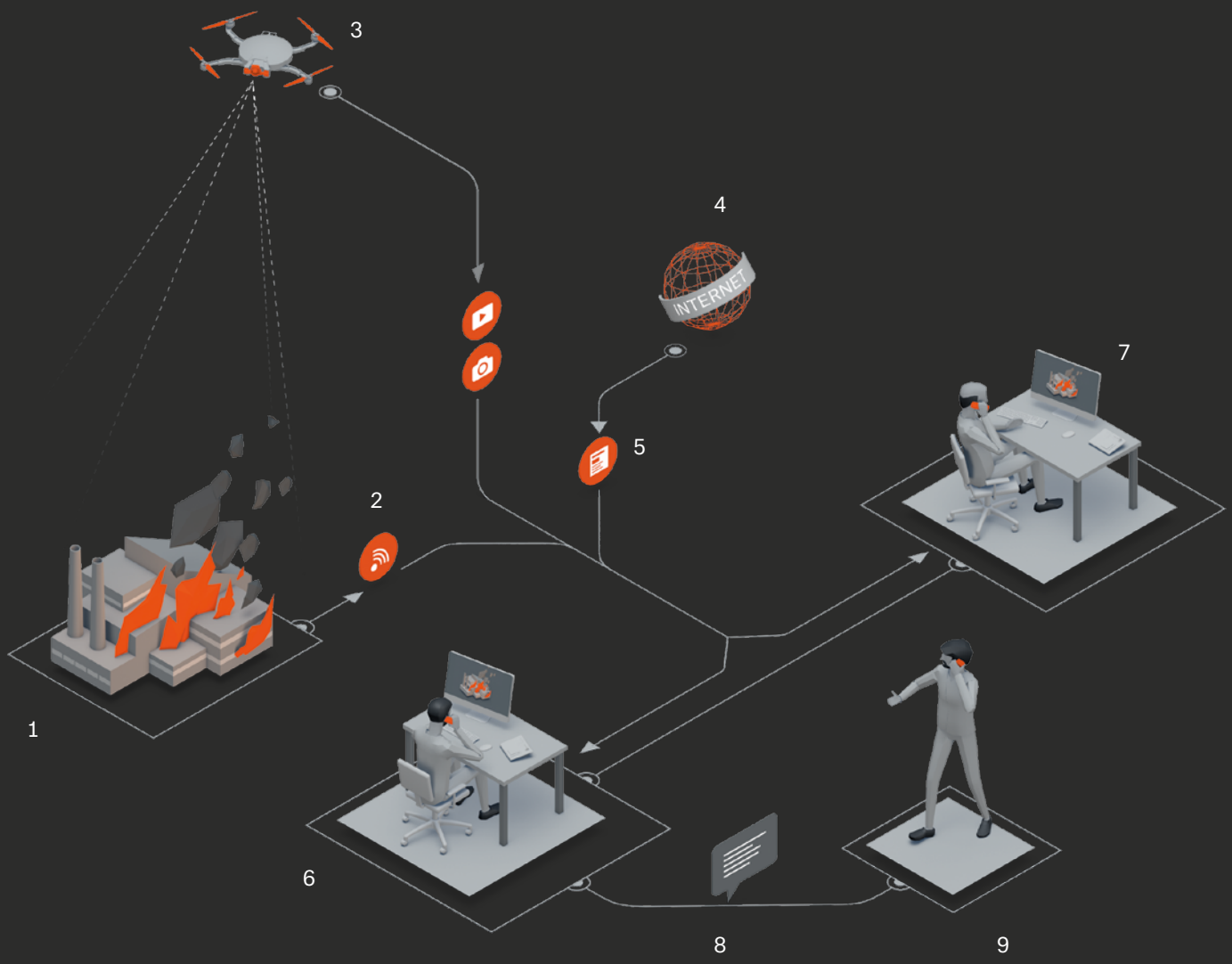
Feghelm Progress is being made in this area with the help of ● text mining and natural language processing – software-based analysis of text in an automated process. The consistency and high quality of the data are the main benefits of using such technologies for data collection. For example, to allow loss events to be promptly detected and trends identified, we are already systematically searching news sites, blogs and social media sources.

With both mass business and very large claims, digitalisation can also be used for loss prevention purposes. Insurers systematically collect data from all legally accessible sources which can be used for this purpose, such as social media. As a global reinsurer, we have the benefit of being able to access primary data while safeguarding our clients' interests. This data is then automatically assessed with the help of artificial intelligence. Data analytics will allow claims trends and unusual developments to be identified at an earlier stage than is possible today, and will also facilitate mitigation of the associated risks. In this way, insurers can begin active claims management much sooner.

Büttner Alongside loss prevention, modern technology will also produce lasting improvements in claims management, both during and after the occurrence of a loss. Take the example of a large fire in an industrial plant: claims management in this instance is a complex process, and full automation of the process poses a major challenge.

Feghelm Particularly with major and complex risks, effective communication with all stakeholders will play a key role, all the way from the policyholder to the reinsurer. Efficiency can already be greatly enhanced today by ensuring rapid access to all relevant information, and greater transparency between the different parties involved. Further improvements will be achieved in the future supported by new mobile and cloud solutions. Information can then be simultaneously shared among participants. For example, if a loss adjuster uses a laptop or tablet to make digital records of data on-site, including photos and videos, these can be made available directly and simultaneously to the insurer and the reinsurer via a data connection and cloud services. This eliminates any waiting times for reports and reduces processing times.

Large-scale fire in an industrial plant: Modern technology will bring lasting improvements in claims management



1
Large-scale fire
A large-scale fire breaks out in an industrial plant.

2
Sensor
Sensors at the plant send live data.

3
Drone
Drones gather photo and video data.

4
Internet
Other data from news feeds is gathered.

5
Collected data
The claims manager and reinsurer have access to the data, which has been automatically evaluated.

6
Claims manager
The claims manager advises the policyholder.

7
Reinsurer
The reinsurer remains in close contact with the claims manager.

8
Chatbots
Chatbots support and assess communication.

9
Policyholder
The policyholder is kept up to date at all times.

Büttner Automation of claims management will greatly enhance efficiency – making the whole process faster at the same level of quality, and cutting payout times significantly. The enormous potential involved here can be illustrated by the example of a large-scale fire in a production facility: remotely controlled drones can produce image and video material at a time when it would be much too dangerous for people to enter the site.

Feghelm At the same time, claims managers can get a good idea of the loss situation directly through a video transmission to their workstations, and advise policyholders on catastrophe management and what steps they should take next. The claims manager will be assisted by intelligent ● chatbots that record information from communication with clients and assess it in real time. So policyholders receive their money sooner and enjoy better service as well, while processing costs are reduced on the insurance side. Eventually, we will be able to identify the cause of loss fully automatically using artificial intelligence and make initial estimates of the loss amount.

Büttner Sensor technology and the ● Internet of Things will also become much more important. Here I am thinking of devices like networked sensors that automatically send massive amounts of data to insurers. With the right evaluation, the data obtained in this way can provide information on losses, and also on early detection of losses and loss mitigation.

Feghelm For example, sensors are already being installed on wind turbines today to act as early warning systems, drawing attention to problems in the gears, and triggering a system shutdown before any greater damage can occur. The production processes of the client (the manufacturer of the equipment) could also be improved at the same time through intelligent analysis of the data. There are virtually no limits to the possibilities in this area. To ensure smooth-functioning processes and allow them to develop their full potential, it is essential for information flows from smart sensors to be seamlessly integrated into the internal system landscape.

Büttner As with claims management, the role of the claims manager will also undergo changes. The role of central contact providing services directly to the client will be added to the function. The internal claims technician will then be given the task of managing the process as a highly qualified manager.

● A chatbot is a computer program which conducts a conversation via auditory or textual methods.

● The Internet of Things (IoT) is the network of physical devices, vehicles, and other items embedded with electronics, software, sensors, actuators, and network connectivity which enable these objects to collect and exchange data.

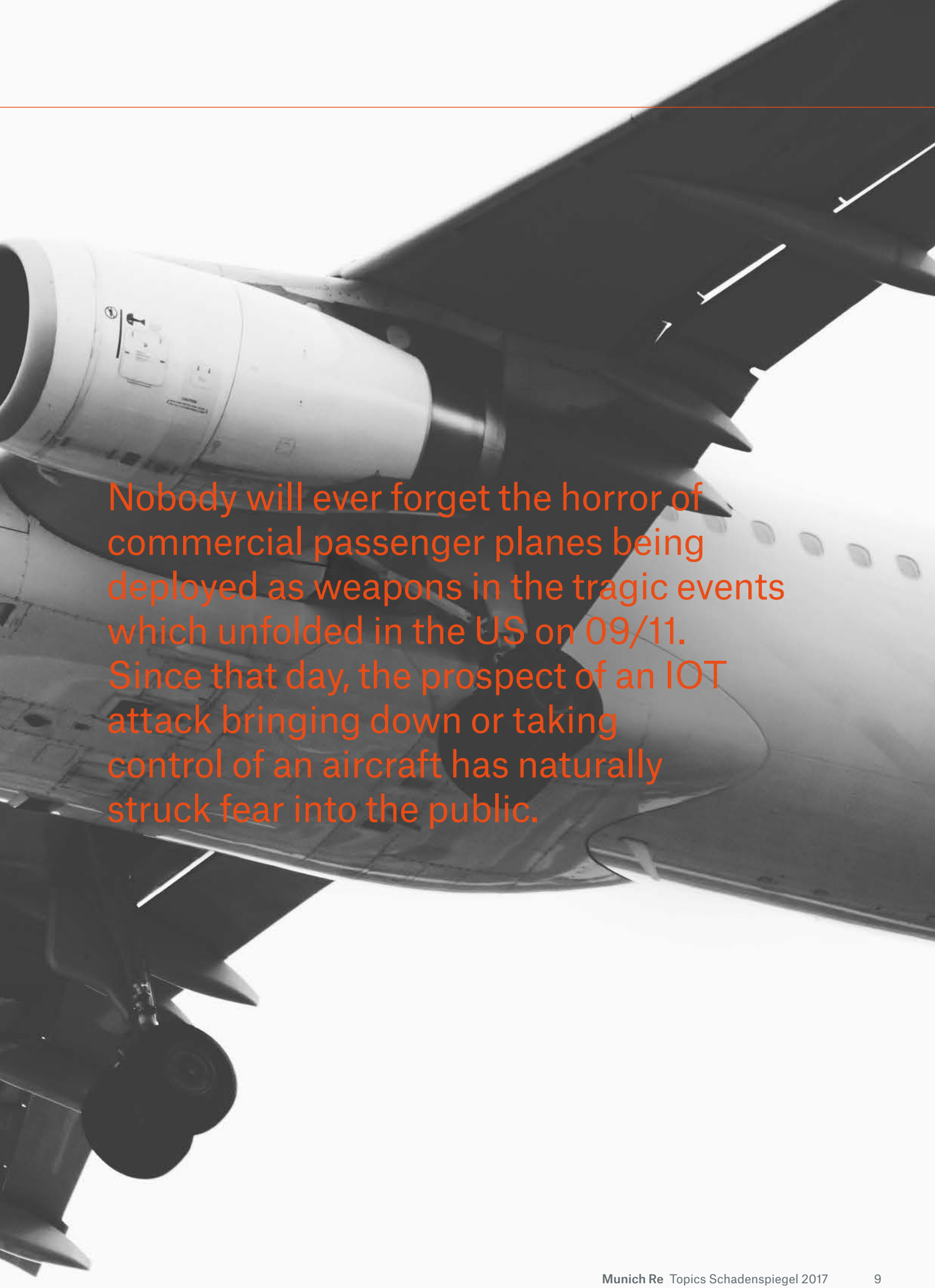
● Data science is an interdisciplinary field about scientific methods, processes, and systems to extract knowledge or insights from data in various forms, either structured or unstructured, similar to data mining.

Feghelm ● Data scientists will also become increasingly important, structuring the data in a practical way, filtering the essential information from the enormous mass of data and identifying future loss patterns. This works particularly well if claims managers, risk engineers and data scientists all work very closely together.

Büttner All in all, the vast array of options offered by digitalisation make it possible for insurers and reinsurers to get a much faster and clearer picture of a loss and to optimise their decision-making processes. For their part, policyholders benefit from faster claims processing and payment, and from the additional services that digital tools offer. —

The sky's the limit?

Helga Munger, Senior Claims Manager



Nobody will ever forget the horror of commercial passenger planes being deployed as weapons in the tragic events which unfolded in the US on 09/11. Since that day, the prospect of an IOT attack bringing down or taking control of an aircraft has naturally struck fear into the public.

Although malicious hacking of critical flight systems is indeed possible, in reality perhaps the more likely scenario is that of less alarming but financially damaging events causing disruption to our travel schedules and losses to the airlines that carry us. The past year or more has seen a number of airlines whose grounding of aircraft has been attributed to a variety of IT failures. Whatever the actual cause, the impact to the travelling public is invariably the same: cancellations and delays often lasting for days, business meetings called off or rescheduled, precious holiday time lost in airport departure lounges.

As strong as the weakest link

What we do not always discuss is the inevitability of IT failures or attacks in such an interdependent environment. Our experience in multiple business sectors is that networks are only as strong as the weakest link. Interestingly, this may translate to the more established and traditional airline carriers being more vulnerable.

There is an inevitability of a struggling airline having little or nothing to spend on updating IT systems when their precious dollar spend must be used for air safety. When an airline is then purchased, the new owner or partner is more likely to try to adopt the legacy system rather than fully integrate and update. Newer airlines without this legacy have a better chance of keeping control of their IT systems and could be a more attractive insurance option.

If insurers and reinsurers want to support this sector with all its challenges, they need a good understanding of the risks involved in this complex and interdependent industry. Airlines are reliant upon global distribution systems which allow automated transactions between travel service providers, typically linking airlines, hotels and car rental companies. Added to this is the process as we take a journey through the airport – from check-in to baggage control, security checks, passport and customs control, catering, fuelling, air traffic control and in-flight entertainment. As a travelling public, our expectation is for all of these to operate seamlessly from departure to destination. Quite a tall order indeed for an industry which is under constant pressure to keep safety standards up and costs down.

Stricter data protection and high fines

Add to this the increase in regulation which comes into force in May and June of 2018: the 2018 European General Data Protection Regulation, anticipating a far stricter data protection environment with significant fines for non-compliance, and the "IATA resolution 753 baggage tracking" with a full chain of custody requirements. Customer information is exchanged with booking agencies and frequent flyer programmes. If data is breached, mandatory notice requirements are triggered, accompanied by a substantial risk of fines and penalties. Many airlines also outsource a number of their IT functions to TP providers, thus complicating the chain and potentially opening up weaker links.

Million-dollar losses

Recent incidents have shown that the costs of losses resulting from IT system failures can soon escalate.

In 2016, two US airlines experienced system failures that led to major disruption to the booking programmes and even flight cancellations. Although these events may not have been hacking or malware issues, they nevertheless provided us with an insight into the level of disruption and costs relating to IT failures. They led to questions from Congress and a statement to the effect: "As operators in this critical transportation industry, it is your responsibility to ensure that your IT systems are both reliable and resilient." This is in an environment of consolidation, which has meant that just four operators now control 85% of US domestic capacity.

The costs of the failures to these two airlines are a matter of some speculation, but publicly expressed views indicate figures of between US$ 80m and 150m each.

In May of 2017, over a busy public holiday weekend, the computer systems of the British flag-carrier airline failed, apparently due to human error, leaving some 75,000 passengers stranded. The parent company suggested that the cost of the incident was £80m – and that does not account for the reputational damage which has followed.

What are the takeaways from these incidents?

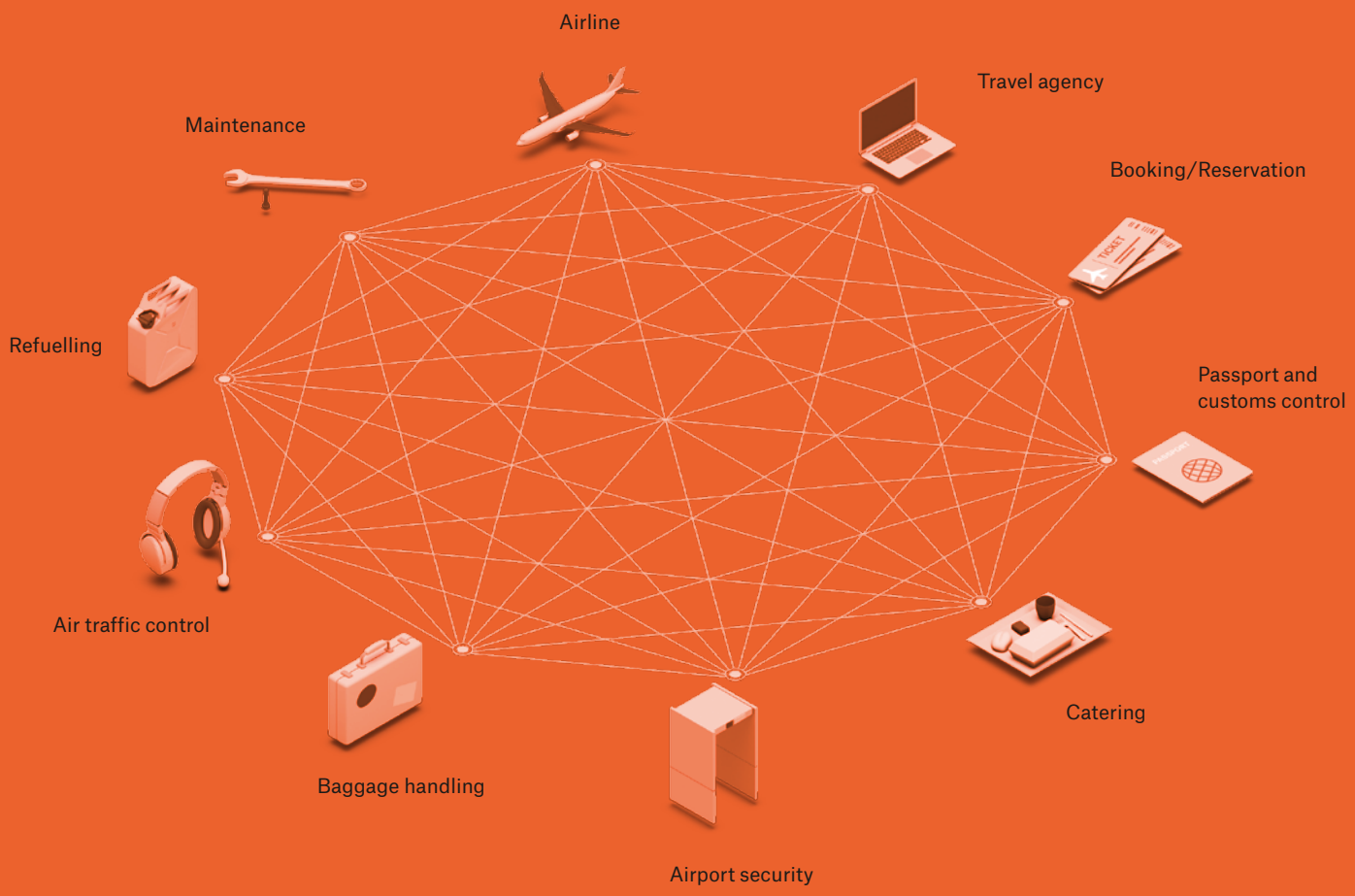
Naturally, prevention and a good regime of cyber resilience and IT "hygiene" are crucial. If problems arise despite these defences, then excellent claims management is required. For airlines this means:

- Fast, effective and well-practised resolution is key.
- Communication failures are an unnecessary expense to the business.
- Poor passenger experiences soon trend on social media and can be damaging, both reputationally and financially.
- Transparency and ownership of the problem make a real difference to the public reaction.

For its part, the insurance industry has to ensure that the claim-preparation and settlement process is simpler, more effective and easier to quantify.

- Coverage and how it will work in practice need to be fully understood.
- Established contact partners make communication easier.
- It is important to explore ways in which differences in expectations can be kept to a minimum.
- Pre-agreed forensic accountants can produce a trusted outcome for both parties.
- Some insurance products offer fixed minimum amounts per passenger flight cancelled.

Insurers know that when an insured has had to spend huge amounts of time and effort to quantify a loss, queries and reductions can strain the relationship. Misunderstandings are not just financially expensive. Naturally, anything we can do to speed up the process and achieve better understanding is in the best interests of all parties.



Source: Munich Re

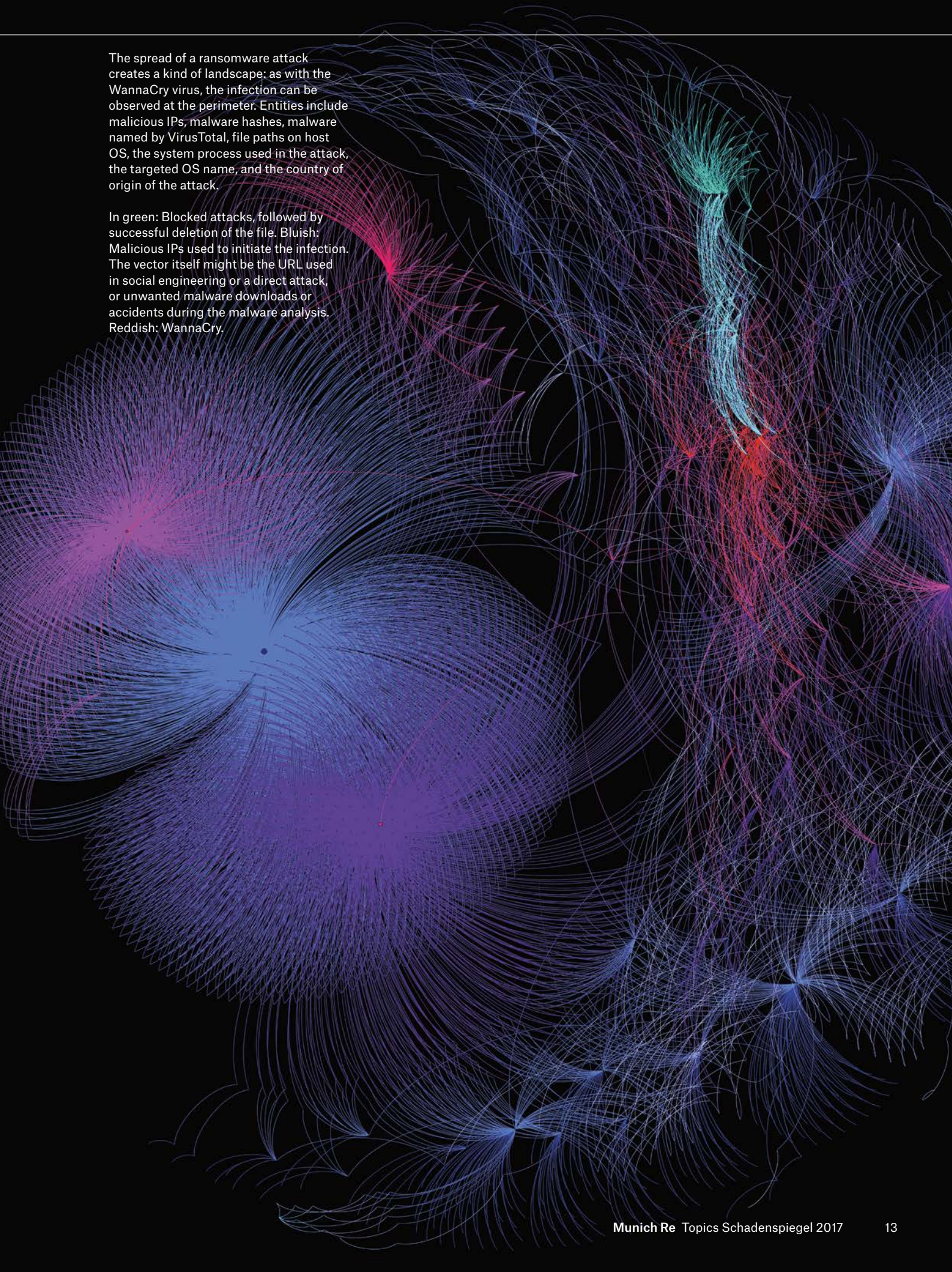
Espionage, sabotage, data theft – losses from cyber attacks cost companies millions and are increasing all the time. As emergency response systems alone are not enough to keep pace with new and ever more complex threat situations, the market for cyber insurance is expected to continue its rapid development.

Martin Kreuzer, Loss Control Consultant in Claims,
and Jakob von Uckermann, Senior Claims Manager

Are you ready for an attack?

In spring 2017, we once again witnessed how vulnerable companies across the world have become as a result of digital networking: on 12 May, within the space of twelve hours, the WannaCry ransomware infected hundreds of thousands of computers and encrypted their hard drives. The attackers demanded a ransom of US$ 300, to be paid in the bitcoin internet currency, from victims in more than 150 countries. Some weeks later, the Petya malware struck, affecting thousands of systems in over 60 countries.

The ransomware aimed at data destruction, deleting sectors on the hard disk. Companies were forced to shut down their systems, which in some cases resulted in huge-scale business interruption. For example, a British manufacturer of consumer goods estimated its loss in production and sales as a result of the shutdown at over £100m. A Danish shipping company quoted a figure of US$ 200–300m.



The spread of a ransomware attack creates a kind of landscape: as with the WannaCry virus, the infection can be observed at the perimeter. Entities include malicious IPs, malware hashes, malware named by VirusTotal, file paths on host OS, the system process used in the attack, the targeted OS name, and the country of origin of the attack.

In green: Blocked attacks, followed by successful deletion of the file. Bluish: Malicious IPs used to initiate the infection. The vector itself might be the URL used in social engineering or a direct attack, or unwanted malware downloads or accidents during the malware analysis. Reddish: WannaCry.

Networked home electronics bring new risks

Back in October 2016, a DDoS (distributed denial of service) attack caused turmoil. Unknown attackers succeeded in paralysing a number of popular web services. The attack was unusual in that the perpetrators hijacked millions of internet-enabled household appliances for their scheme. They exploited weaknesses in the software of the different devices to form what are known as botnets. The hackers used the concentrated computing capacity of these networks for their cyber attacks.

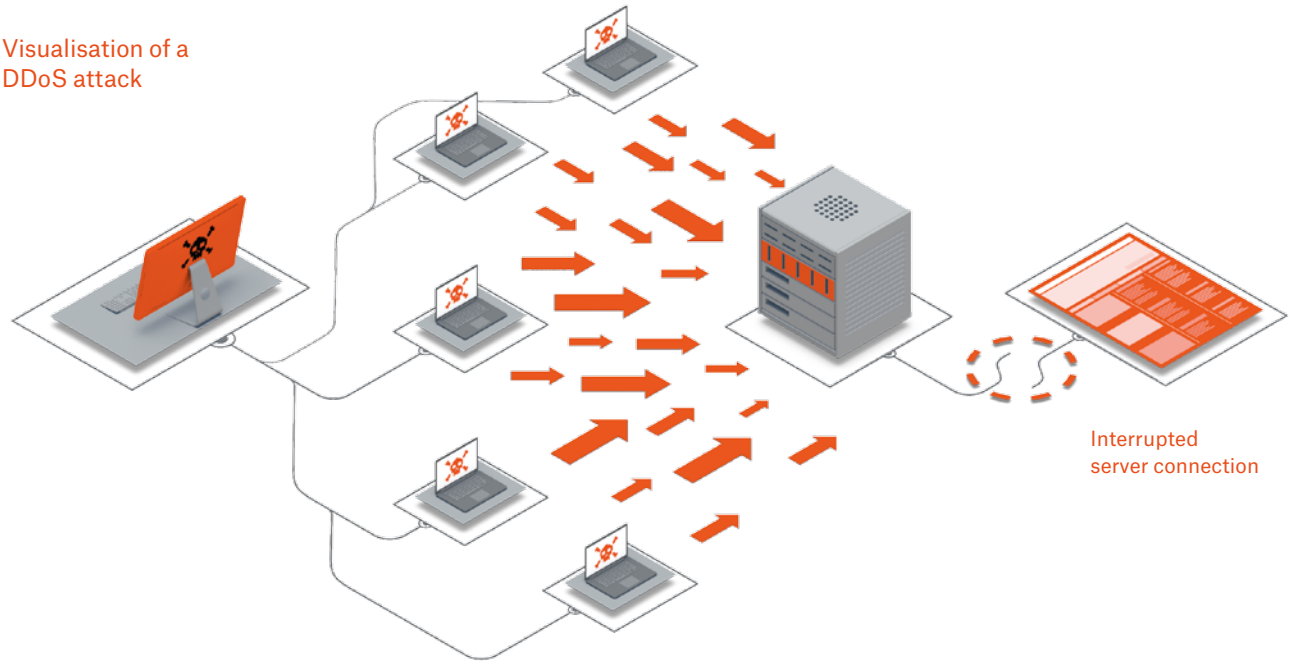
The opportunities for hacker attacks are increasing with the spread of networked home electronics. Billions of these devices are in use every day, and the figure will run into the tens of billions as the Internet of Things expands. A further problem is that many providers of devices – especially inexpensive ones – fail to take adequate protective measures.

Another reason the cyber attacks of October 2016 were so devastating was that the attackers targeted a critical network node – the domain name system (DNS) controlled by the American service provider Dyn. This translates web addresses like www.munichre.com into the actual IP addresses for the different websites. If DNS services are paralysed, a large number of websites can be cut off in one fell swoop, even if their own infrastructure is functioning perfectly.

Wake-up call for the insurance industry

Recent incidents illustrate how important it is to have protection against the consequences of cyber attacks. IT security and the protection of data (both a company's own and that of third parties) are becoming a central element of this strategy. Not surprisingly, cyber attacks are directed against companies assumed to have a lot of money. The more online interaction a company has with customers and suppliers, the more disruptive the attacks can be. Cyber insurance not only provides cover for business interruption and ransom payments, but also helps companies recover lost data records.

Visualisation of a DDoS attack



Hacker
A hacker infects bots with malicious software.

Bots
The bots are linked up in a botnet and all "work" for the hacker.

DDoS attack
Together, the bots attack a server by flooding it with requests.

Server
The server crashes under the volume of traffic.

Website
The website is no longer accessible

Source: Munich Re

Cyber risks: Facts and trends

Bearing in mind the threat scenarios and the dynamism of technical and digital developments, the following trends and challenges can be expected in relation to cyber risks:

- The battle between attack and defence in cyberspace continues. The insurance industry will become increasingly involved in this development as the number of cyber covers increases. It is clear that cyber attacks, and therefore cyber losses, will continue to increase in terms of amount and frequency as a result of increasing complexity and networking.

- The use of emails, especially phishing emails, remains a popular gateway. Spear phishing (where selected persons are taken in by plausible-sounding emails) is more professional, and can be used for targeted attacks – frequently accompanied by other attack patterns such as social engineering.

- Attacks on especially lucrative targets using ever greater levels of sophistication and professionalism are likely to rise. Alongside corporations and high-profile public figures, attackers are increasingly focusing on critical infrastructure as so-called high-value targets. These include systems used for energy supply and telecommunications, systems in financial institutions, and the transport and health sectors. In future, therefore, cyber security will no longer be there simply to ensure the integrity, availability or confidentiality of data. It will also be used to protect life and limb, or to maintain public order.

- It is now virtually impossible to distinguish between financially motivated cyber criminals and state-sponsored hackers.

- The theft of personal data remains the primary objective of cyber criminals, with the value of the data constantly fluctuating according to supply and demand.

- Hacker attacks and leaks are posing an ever greater threat to democracy and sovereignty. This can take the form of the manipulation of content on social networks or social media, but also targeted attacks on political parties, individuals, public authorities, government ministries or business enterprises. The objective here is to influence politics and public opinion. Learning robots (known as social bots) are being increasingly deployed to take over social networks and discussion forums. They create blogs, images or comments with prescribed thematic content.

- The Internet of Things will create new vulnerabilities, as smart and networked devices often feature security gaps and can be (all too) easily compromised. We should therefore expect a new slew of cyber attacks, such as DDoS attacks, based on mobile end devices or smart devices. Ensuring the security of these smart and networked devices and networks must be seen as a crucial issue, simply because of the explosion in the numbers involved (rough estimates put the figure at between 30 and 50 billion networked devices worldwide by 2020).

- In tandem with this, an answer needs to be found to the question of who is responsible for failures on the Internet of Things with its smart devices, and what binding security standards should apply. Governments, regulatory authorities, manufacturers, and ultimately users too, will each need to play their part. They will need to monitor the cyber security of products and their use over the entire life cycle. New regulations on data protection, such as the new EU General Data Protection Regulation are only the start.

- Cloud solutions for security, infrastructure, managed services or data storage are becoming more and more attractive. Because of this, such services also represent a critical bottleneck.

- More and more attacks will be controlled using artificial intelligence adapted to human behaviour.

Cyber crime: Who are the perpetrators?

Searches for clues after cyber attacks show that the perpetrators can be categorised into different groups, depending on their motivation, level of expertise, selected targets and resources used:

1

So-called cyberkids or script kiddies, with no great level of expertise themselves, who try to penetrate others' computer systems using ready-made applications. Their motivation is often curiosity, fun, or to compete with friends and peers. The example of British-born Junaid Hussain shows that cyberkids can graduate to become notorious hackers and cyber terrorists. After starting off as a talented script kiddie, he developed into a cyber criminal, and ended up as the mastermind of the Islamic State's "Cyber Caliphate".

2

Hacktivists, such as groups like Anonymous, LulzSec or AntiSec, who mainly operate out of political and ideological conviction, and are not profit-oriented. One of the most well-known is Julian Assange, the founder of WikiLeaks.

3

Governments and their highly equipped secret services or cyber armies, who use the internet for the purposes of espionage, strategic surveillance, or even active warfare. The world's first cyber weapon is believed to have been the Stuxnet virus. This malware was used to target the Siemens industrial control systems installed in Iran's nuclear power plants, and in 2010 it destroyed an estimated 1,000 uranium centrifuges. The attack resulted in a substantial setback for Iran's nuclear programme. In the media, the USA and Israel were repeatedly named as the perpetrators.

4

Cyber terrorists or jihadists, who use cyber attacks as a source of financing, or to propagate their ideology, and who wish to radicalise sympathisers online. A notorious example is the "Cyber Caliphate" of the Islamic State. The level of competence of cyber terrorists is considered relatively low, but it must be assumed that certain groups buy in expertise from cyber criminals, or even receive support from state agencies.

5

Cyber criminals and hackers, who are only interested in profit, and whose level of professionalism and networking is steadily growing. Also on the rise is their willingness to sell expertise and customised cyber attacks as "crime as a service". For example, just a few clicks on the dark net is all that is required to purchase or lease personalised ransomware or DDoS attacks.

6

In addition to the external perpetrators, insiders, employees and users of IT systems also pose a risk. They can either cause damage deliberately – whether because of personal motivation such as a grudge against their employer – or due to ignorance or negligence.

Distinguishing clearly between the individual players involved is becoming increasingly difficult. This trend is likely to continue as hackers increasingly exchange expertise across a range of disciplines and countries. In addition, greater use may be made of techniques that hide a person's real identity. Security services have also established that individual cyber criminals are overlapping more and more in terms of their business strategies. For example, terrorists, corporations or even state agencies are purchasing cyber crime services from organised crime groups (crime as a service).

And even governments can operate as criminal service providers. For example, the North Korean cyber army (known as Bureau 121) is suspected of directly financing its government through state-controlled cyber crime and the sale of services. Other (Western) governments unwittingly generate new vulnerabilities by combating cyber criminals with their own weapons. According to US intelligence services, more than 30 governments are currently developing programmes for offensive cyber operations, sometimes using malware similar to WannaCry or Petya.

The fact that an increasing number of government agencies – even in Germany – are commissioned to carry out hacks, and thus receive access to arsenals of government malware, increases the probability of the policy having a boomerang effect. What has repeatedly happened in the past is that government cyber tools were either stolen or made public by insiders. The publications of the hacker group Shadow Broker, and WikiLeaks' so-called Vault 7 revelations, are good examples of this. Among other things, the latter published details of tools for committing cyber attacks or neutralising antivirus programs – tools that originated from the NSA and the CIA.

In this way, attackers are given the opportunity to use ever more complex and even combinable tools. And digitalisation is creating entirely new fields of activity. For example, a separate market could develop for biometric information, which criminals, terrorists, or radicalised activists could all use to offer or acquire services in return for virtual currencies such as bitcoins.

Companies can protect themselves against cyber risks, with different risks covered by different policy designs. Cover can be summarised as follows:

- Ransom payments are insurable as far as is legally permissible. Costs for external consultants are also covered. There is usually a deductible in place, which would have applied in most instances in the WannaCry attack.

- Business interruption as a result of a cyber attack can be covered, even without prior property damage. In this case, there is generally also a deductible or sub-limit, along with a time deductible (waiting period). The waiting period can be up to 12 hours, during which time many attacks can be neutralised.

- The protection against loss of data and data corruption includes the costs needed to determine the causes and effects of a cyber attack. The costs for recovering data and removing the malware are also covered.

- Cyber insurance can also cover the loss of personal data or liability claims from third parties.

At the same time, the events were a wake-up call for the insurance industry to focus more strongly on the accumulation risk in the field of cyber risks.

The industry is already using data-based methods to model cyber events. These models are based on scenarios that focus mainly on the frequency and severity of incidents. Possible scenarios include the spread of malware or spyware across systemically relevant operating systems, the disabling of a large cloud service provider, or an attack on the infrastructure of the internet. The aim of the models is to determine the financial impact of cyber mass-attack scenarios like WannaCry or Petya.

Traditional exclusions do not always apply

Recently, it has become increasingly difficult to categorise and distinguish between different types of cyber attackers (see summary on the left). This further complicates matters for the insurance industry. Traditional exclusions in a policy, such as for terrorism or war, may not apply, since governments and secret services are unlikely to admit to participating in a cyber attack. Even in the case of cyber terrorists – who are certainly interested in publicising their cyber skills in the media – it is difficult to prove who the perpetrators are and thus obtain evidence for a contractual exclusion.

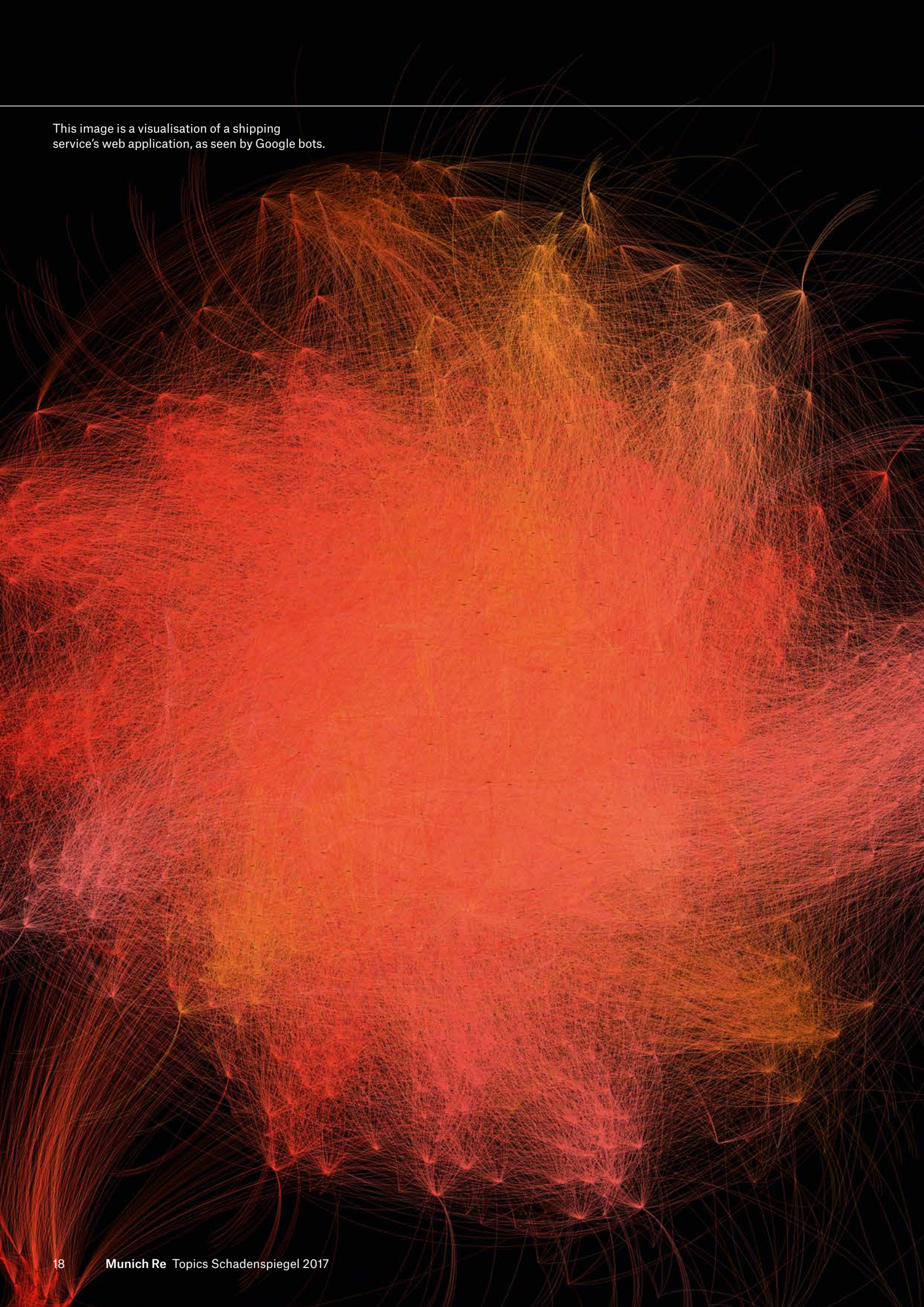
A good example of this was the cyber attack on the French television channel TV5 Monde in April 2015. Programmes were interrupted for several hours and the channel's web pages were filled with Islamist logos and slogans from the so-called "Cyber Caliphate". Despite the fact that every internet user who visited the TV5 Monde homepage saw the flag of the Islamic State on there, computer forensic investigators believe that Russian hackers were actually behind the attack. The channel estimated the cost of recovering and securing its systems at just under €5m.

Insurance increasingly in demand

Entire industrial sectors and therefore economies, governments and society itself, are dependent, more than ever before, on a functioning IT and telecommunications landscape. In order to counter these increasingly complex threats, the market for cyber insurance is likely to experience dynamic development as technical advances and increasing digital networking drive demand. Widely publicised cyber attacks coupled with new rules from regulatory authorities and governments (especially the EU General Data Protection Regulation with new rules on data protection and reporting requirements, due to come into effect in all EU member states on 25 May 2018) and a growing awareness of cyber risks will also promote the spread of cyber policies. In the USA, the largest market for cyber insurance, the volume of stand-alone covers increased by 30% per year between 2011 and 2015 to US$ 1.5bn.

On the claims side, we can expect that sophisticated ransomware or DDoS attacks will lead to an increased number of business interruption cases. One of the tasks of an insurance company in this context will be to guarantee prompt assistance to minimise cyber-related losses. Irrespective of demand, insurers that have not offered cyber products up to now should estimate their own cyber exposure in traditional property or casualty lines, and address the topic of "silent cyber" in their internal risk and portfolio analysis. Munich Re's response in terms of its own portfolio is to actively manage such risks, to pursue a clearly defined cyber strategy and to make further investments in cyber underwriting and risk expertise. —

This image is a visualisation of a shipping service's web application, as seen by Google bots.



Many obstacles, but great potential

Although digitalisation is still in its infancy when it comes to handling large claims, it offers enormous potential for increased efficiency and for data-driven decision-making. The difficulties involved in adopting automated claims management procedures should not deter insurance companies from developing new solutions.

Thomas Schreiner, Head of Data, Systems and Analytics Claims,
and Michael Hecht, Data Scientist

When it comes to major losses in the industrial and commercial sectors, rapid decisions are key. Policyholders are keen to find out what steps they have to take, how business can continue, and what assistance they can expect. This is a challenge for insurers, who must not only select the right experts and coordinate damage limitation and clean-up measures, but also ensure smooth communication between the different parties. They must also estimate the loss amount for reserving purposes, check the scope of cover, and manage any disagreements concerning the interpretation of cover.

Compounding these difficulties is the fact that decisions must be made quickly but are always fraught with uncertainty. Reserves that are too high or too low can be corrected at a later stage, but an incorrect assessment of a coverage dispute can cost the insurer dear. When deciding whether to accept the risk of years-long court proceedings or agree to a settlement, you have a clear advantage if you are able to base your choice on comparable cases rather than simply relying on gut instinct.

Individual loss patterns

Since major losses do not occur frequently, the rate of automatic data collection for claims management is lower than that for personal lines mass business at a primary insurer – in health insurance, for instance. The reason for this is that it is difficult to accommodate complex claims procedures, with their individual loss patterns, in a standardised structure. In the case of major claims, there is also the fact that the insurer often has the relevant claims information in free-form text only, making automatic processing of the data more difficult. Insurers are often unable to automatically filter out and process key information from complex, unstructured text.

Inadequate data quality and a reluctance to exchange data between different operational units pose further obstacles to achieving automatic processing of claims information. Also worth mentioning are the challenges that the average IT department faces when confronted with the new torrent of data. If the data can be accessed for automatic processing, resources need to be made available for data analysis, and experts with the relevant professional and technical skills found.

Digitalisation offers opportunities

While such diverse problems may at first sight appear difficult to overcome, the progressive digitalisation of the insurance industry provides the tools needed to do just that. As we head towards digital insurance, there is enormous potential for increased efficiency and data-driven decision-making. Trends can be identified earlier, claims managers and underwriters can respond faster, and insurers can save resources in claims handling.

With powerful data collection tools and advanced methods of data analysis, the shift towards digitalisation will not stop at major losses. Machine learning in particular will continue to grow in importance. This uses a range of techniques that enable computers to recognise patterns found in data and to autonomously discover correlations. Methods from classical statistics and computer sciences are applied. Given their statistical nature, such methods require a certain volume of data in order to recognise meaningful patterns. This still poses a major challenge in the large-loss segment in particular, where each case has an individual character.

Development in several stages

The typical journey to digitalisation in the management of major claims takes place in several stages, each of which delivers significant added value (see summary on the right).

1

Create the framework conditions

In the first stage, clearly defined framework conditions should be created for the digitalisation project. Company-wide data governance should regulate access to information and set out responsibilities. This could be considered the basic organisational requirement for the subsequent stages.

As well as providing organisational clarity, this measure makes a clear contribution to maintaining and enhancing data quality. It has also proven expedient to set up a separate operational unit for the digitalisation project. This is simply because, as a rule, data generally involves both insurance-related and technical issues.

Digitalisation is therefore a topic of relevance to both the underwriting and IT departments, and allowance should be made for this by creating a relevant cross-functional team.

2

Consolidate and digitalise internal data sources

In the second stage, existing internal data sources should be consolidated and combined with loss data – a frequently daunting task.

Potentially interesting and relevant information is often found in separate specialist and technical data silos, which must be analysed and then merged. Often, these are systems that have been used in parallel by different organisational units for years or even decades – generally for different purposes – and were never designed for later analysis.

The next challenge lies in the digitalisation of loss information in text form. Here, a distinction needs to be drawn between simple digitalisation – that is to say, the conversion of text into a machine-readable format – and the automatic extraction of information from machine-readable text.

While digitalisation alone is not that hard to achieve, the automatic extraction of information is more difficult.

3

Build up expertise in specialist and technical analysis

Once the internal data sources have been combined, the next step is to analyse historical major loss information.

Of interest here are findings on the causes of losses, their geographic distribution, and predictions concerning the duration or severity of a loss. At this stage, it is essential to pair up analytical expertise with the specialist know-how of claims managers.

Implausible results can then be quickly identified and the possible causes, such as data quality problems, can be addressed. If text has been prepared digitally, special semantic search algorithms can be used along with keyword searches.

This reveals connections that might otherwise have remained hidden had claims files been processed manually. Complex major claims can then also be compared, establishing relevant commonalities and differences, and investigated with a view to improving the efficiency of claims management.

4

Connect external data sources (big data)

Once the internal data sources have been inspected, one can consider connecting external data sources to enrich the claims information.

Contract data from underwriting or other operational units could be helpful, as could connections with information from external data providers. Information from news feeds is also a possibility, along with detailed geodata and macroeconomic indicators.

A further possibility would to be to link up with inventory lists for stored large appliances as a useful aid to claims handling in property insurance.

5

Development of innovative data products

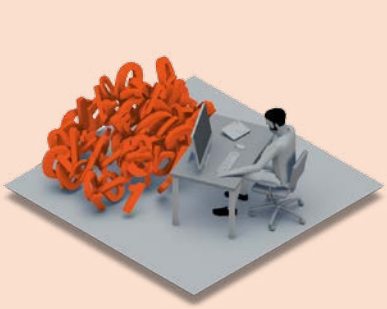
The final stage is the development of innovative data products. In this context, it is sensible to focus the different uses on the value chain in claims handling.

When developing this type of solution, it is also recommended not to "blindly" record data that has not yet been generated. Instead, the uses should be precisely defined in advance.

Otherwise, there is a risk that the data quality will need to be laboriously adapted to fit the particular area of use at a later stage. Frameworks for this kind of data-driven solution should also be precisely defined at the outset to avoid the development bypassing the needs of future customers and tying up resources unnecessarily.

The IT start-up scene's agile approach, applying the minimal viable product (MVP) and iterative improvement methods, has proved very successful in this context.

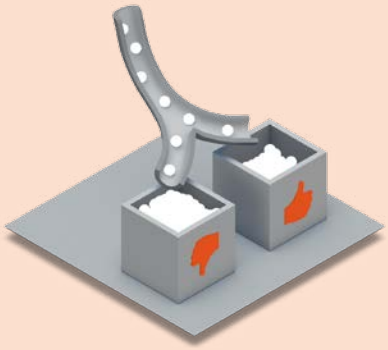
Identified and defined challenges



Shortage of data analytics manpower

Especially in combination with insurance/ claims know-how

- Data cannot be analysed at all or in time
- Data may be interpreted falsely
- Core data knowledge is not internalised



Inadequate data quality

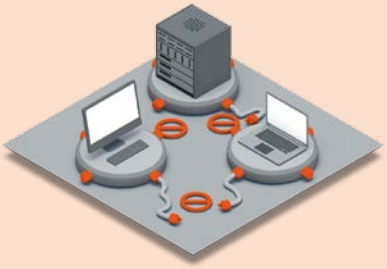
The data captured in the system is woefully inadequate in terms of quality and quantity for most of the desired use cases.

- Most valuable use cases cannot be implemented
- High risk of wrong assessments
- Major manual effort for validating data

Low level of systematic capturing of data due to shortage of manpower

Not possible to systematically capture original data from cedants

- Loss of valuable data
- Heterogeneous insights based on independent data handling
- Limited big data analysis



Claims data governance not properly regulated

Poorly regulated standards and no dedicated and equipped unit for data handling and management to provide properly connected and prepared data to the appropriate target group

- High risk of wrong insights
- No centrally defined compliance rules for handling data
- Heterogeneous insights based on independent data handling

No data sharing strategy across units

Limited willingness to share and trust in data within and across departments and units

- Heterogeneous insights based on isolated data view
- Existing data to improve data basis not used
- Insufficient analysis of existing data

Source: Munich Re

Variety of new digital tools

Once you have made it possible to develop innovative data products from digitally available claims information, you can consider offering these as services. Some examples are given below:

Data-based proactive claims management:
Particularly with major claims, a lengthy period can elapse between the occurrence of the loss and claims notification. You can drastically reduce this period in property-casualty insurance by using external information and linking it up with your own exposure data. With its system for scanning digital news sources to find reports of fire damage, Munich Re has already demonstrated how this can work and now offers this solution as a service.

Research tools to identify links:
Using semantic search functionalities, text can be searched not only for keywords but also for content and meaning. This allows prescribed variables to be automatically linked. For example, potential supplier relationships between companies can be automatically extracted from news articles. This information can then be processed in what is known as a knowledge graph, which visually represents the extracted connections. Here, too, Munich Re has demonstrated the practicability of such a knowledge search engine.

Identification of reference claims:
In the area of major claims, existing digitalised information on comparable claims can greatly reduce claims managers' workload – provided they have the right analysis tools. This allows them to back up their decisions with empirical data, meaning they no longer need to rely solely on their own experience and instinct.

Digitalisation of text:
Similarly, standardised tools to collect data from non-structured documents can greatly ease the burden on claims managers. These tools filter and structure all the relevant information from a claims report, and can also be offered as a service to smaller insurers.

Identification of relevant documents:
A further aid for claims managers in their day-to-day work is the automatic identification of documents that are needed for future analysis. Efficiency would skyrocket if it were possible to automatically calculate how high the probable loss is, how it is distributed between property insurance and business interruption, and what the relevant loss drivers are.

Underwriting also benefits

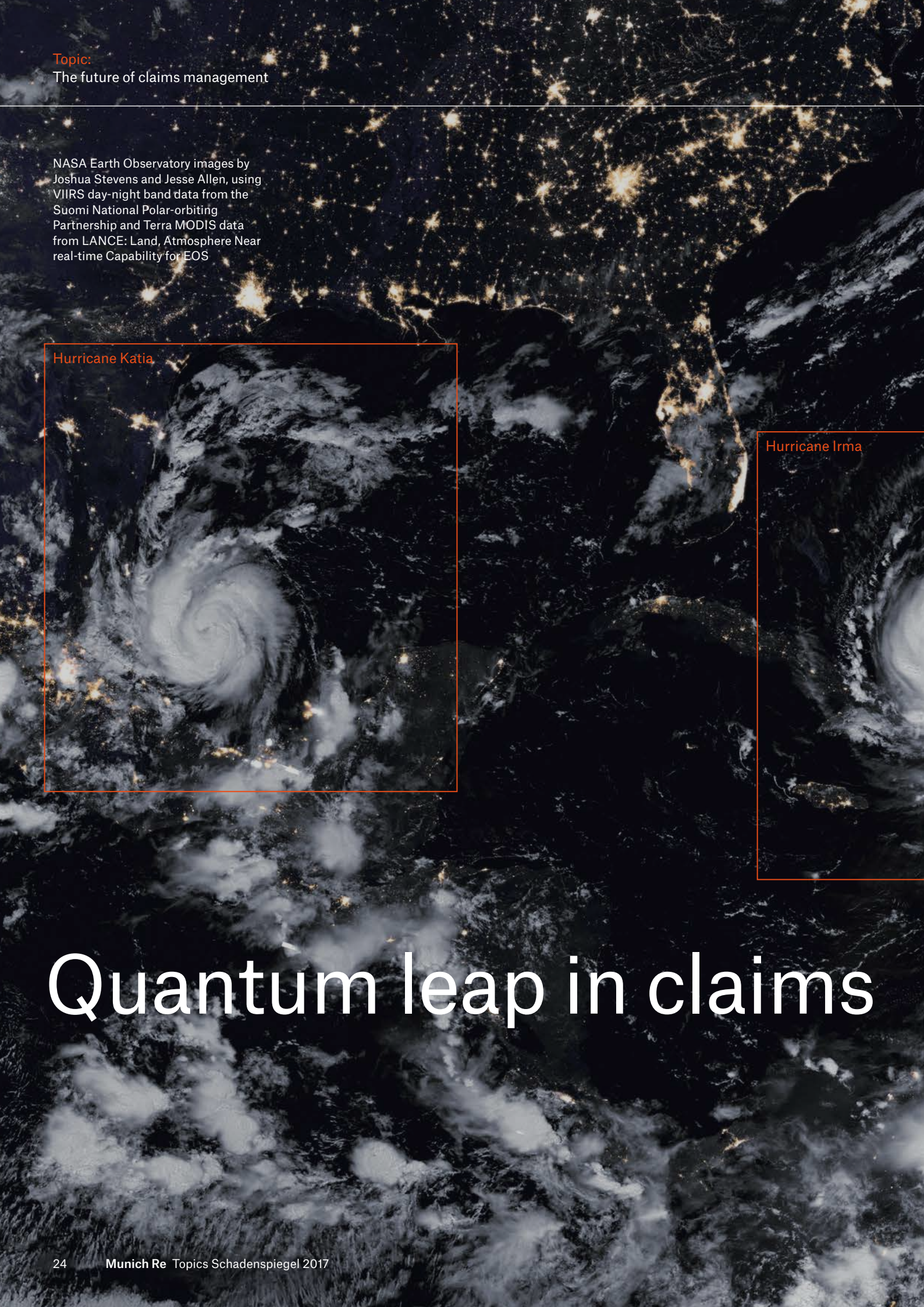
Digitally accessible claims information offers significant advantages – not only for claims management but also for underwriting. Provided there is enough historical data, loss drivers can be identified and premium calculations adjusted to allow for actual developments. To do this and ascertain findings from experience values gathered over the years, it is essential to link up claims and exposure data. In the area of long-tail claims in liability insurance in particular, such linked historical data sets are of immense value. They help to reveal gradual developments that an insurer would otherwise only become aware of at a later date. This kind of early warning system, with access to both internal portfolio data and external data sources, can offer underwriters invaluable information.

Findings ascertained from historical data on major claims can also be directly incorporated into the design of new underwriting products, making a key contribution to the refinement of the business model as a whole.

Full automation a distant prospect

The final stage of the journey to digital management of major claims could see claims management becoming a largely automated process without much need for human input. Powerful algorithms would then be used to predict the outcome of future large losses and to achieve more or less automated claims handling.

However, due to the complexity of the major claims segment and the relative infrequency of the events, complete automation of claims handling is unlikely in the near future. In contrast to primary insurance – where a lot of claims handling is already being carried out without any claims technicians whatsoever – validation and plausibility checks on major loss data will remain in human hands for some time yet. Progress with the digitalisation of major claims management will mainly depend on the extent to which data sources can be utilised and professional claims expertise linked with analytical know-how. —



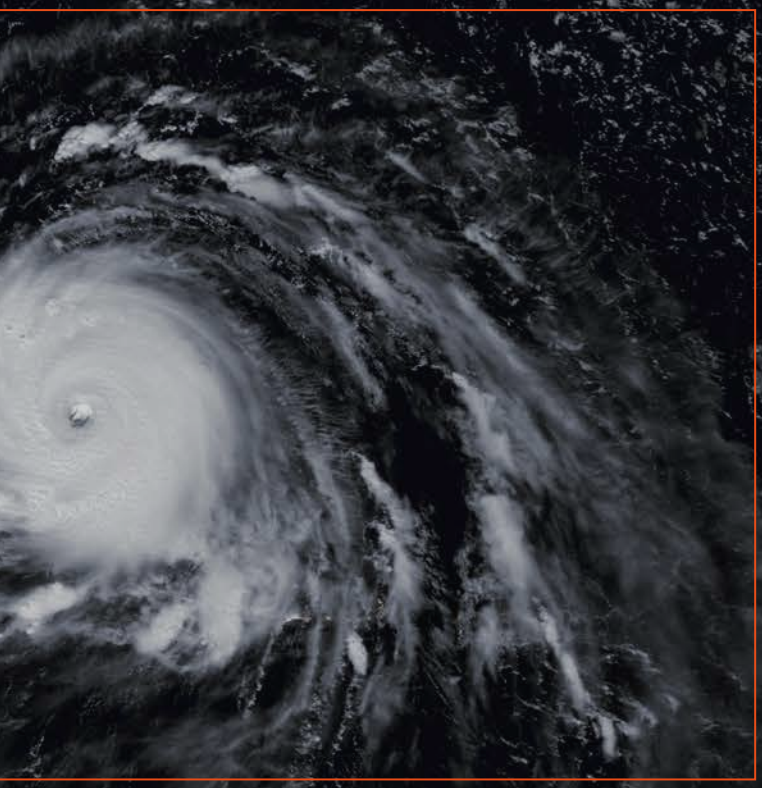
NASA Earth Observatory images by Joshua Stevens and Jesse Allen, using VIIRS day-night band data from the Suomi National Polar-orbiting Partnership and Terra MODIS data from LANCE: Land, Atmosphere Near real-time Capability for EOS

Quantum leap in claims

assessment

Aerial photos and sophisticated analysis methods are set to make claims management of natural catastrophes much easier. In the Munich Re innovation lab, experts are working to develop the digital and automated solutions of the future.

Thomas Schreiner, Head of Data, Systems und Analytics Claims,
and Paul Zernik, Solution Manager in Claims



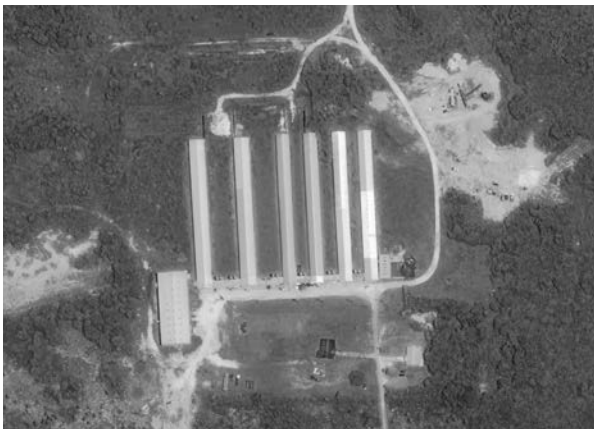
Hurricane Jose

Natural catastrophes such as earthquakes, cyclones and hurricanes generally result in wide-scale losses that require enormous effort and resources to settle. Infrastructure is often destroyed and communication systems disrupted, making it more difficult for insurers to process claims promptly and professionally. There is also the problem that valuable information is often missing in the days and weeks following a catastrophe. What is more, there is often a shortage of qualified loss adjusters available because capacity for major loss events cannot be kept permanently on local standby. As a result, insurers' claims departments are stretched to the limit for weeks on end and struggle to cope. Staff from other divisions are brought in to assist, forcing them to postpone their own work.

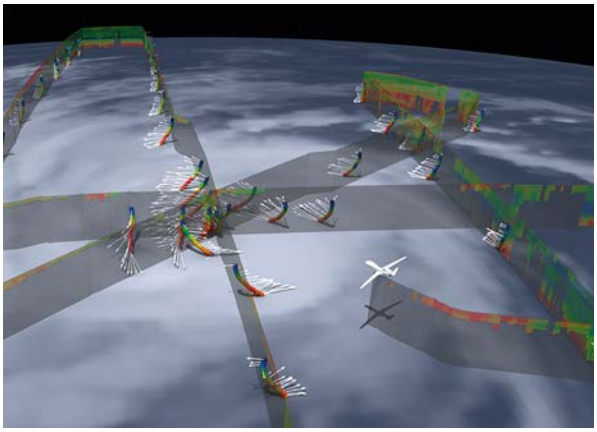
Faster and more cost-efficient claims settlement

Munich Re is convinced that increasing automation will solve many problems in the area of claims settlement. The aim is to progressively simplify and accelerate processes that are mostly manual today, with the help of the latest technologies. This could massively reduce the costs of claims settlement. But insurance customers would also benefit from faster indemnification, which in turn would have a positive knock-on effect for primary insurers in the form of higher levels of customer satisfaction.

The key to such improvements lies in the consistent use of remote-sensing systems: aerial photos help to define the areas affected by a natural catastrophe, and to identify and classify losses. And if a company has a geocoded portfolio, the exposure can then be calculated with minimum effort. This is already the state of the art today.
In cases where satellite images are not available, or not in good enough quality, what are known as HALE drones could be used instead. This acronym stands for High Altitude Long Endurance. High altitude in this context means deployment at more than 15 km above the surface of the Earth. Long endurance means that the drones can operate for up to three months with the help of solar-powered drives. The HALE drones provide images with a higher resolution than satellite photographs, and these images are now more widely available with the increasing spread of the technology.



This image shows how NASA scientists used an unmanned Global Hawk aircraft to study Hurricane Edouard. Dropsonde data is compared to SHIS curtain data as the aircraft flies back and forth over the storm. Relative humidity is displayed with blue representing dry air and red representing moist air. Additionally, dropsonde wind vector data is displayed using white arrows.



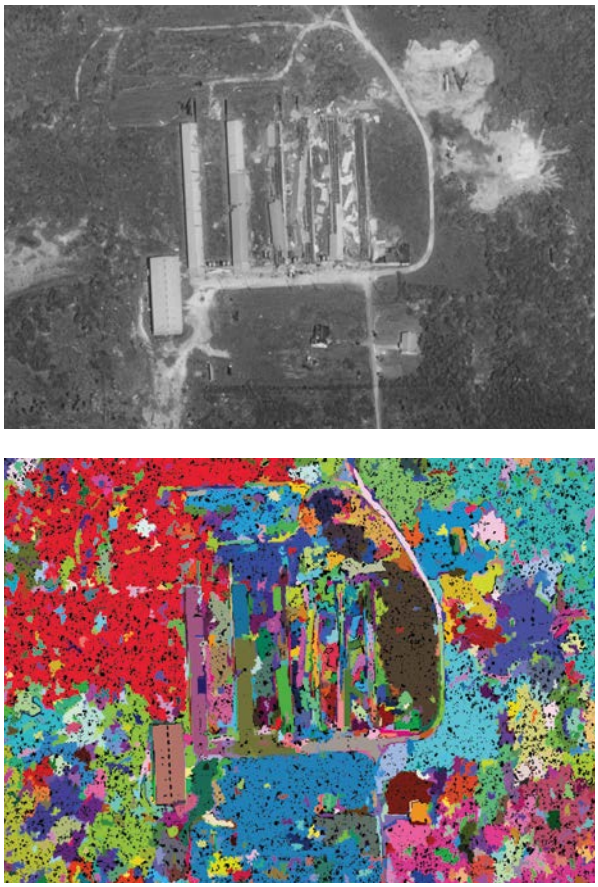
Complemented by remote sensing

If claims are classified according to their severity, loss adjusters can be deployed more efficiently, allowing specialists to be sent to investigate the most complex cases. Munich Re anticipates that automation will have reached a high level of sophistication by 2025, driven by remote sensing, geoinformation systems, image-processing algorithms and digital platforms. Satellites alone are not enough, because their image resolution is too coarse – for example to identify missing tiles on a roof. Alternatively, the policyholder could take pictures or make videos of the damaged property and send these to the insurer on a mobile phone. In conjunction with aerial image analysis, this could help create an accurate damage profile.

A loss estimation engine will then be able to calculate the nature and amount of damage. Data from remote sensing and from the policyholder will be checked using algorithms and supplemented with experience values from the past. The degree of automation will increase further with the spread of sensors that can recognise, for example, whether a wall has shifted or sunk. In terms of specific applications, the focus will initially be on the natural hazards of storms and earthquakes, because the damage they cause is the easiest to identify using remote-sensing methods. While the assessment will initially be carried out by a claims technician, it is conceivable that, with the growing proliferation of artificial intelligence, an algorithm will be able to assume this task.

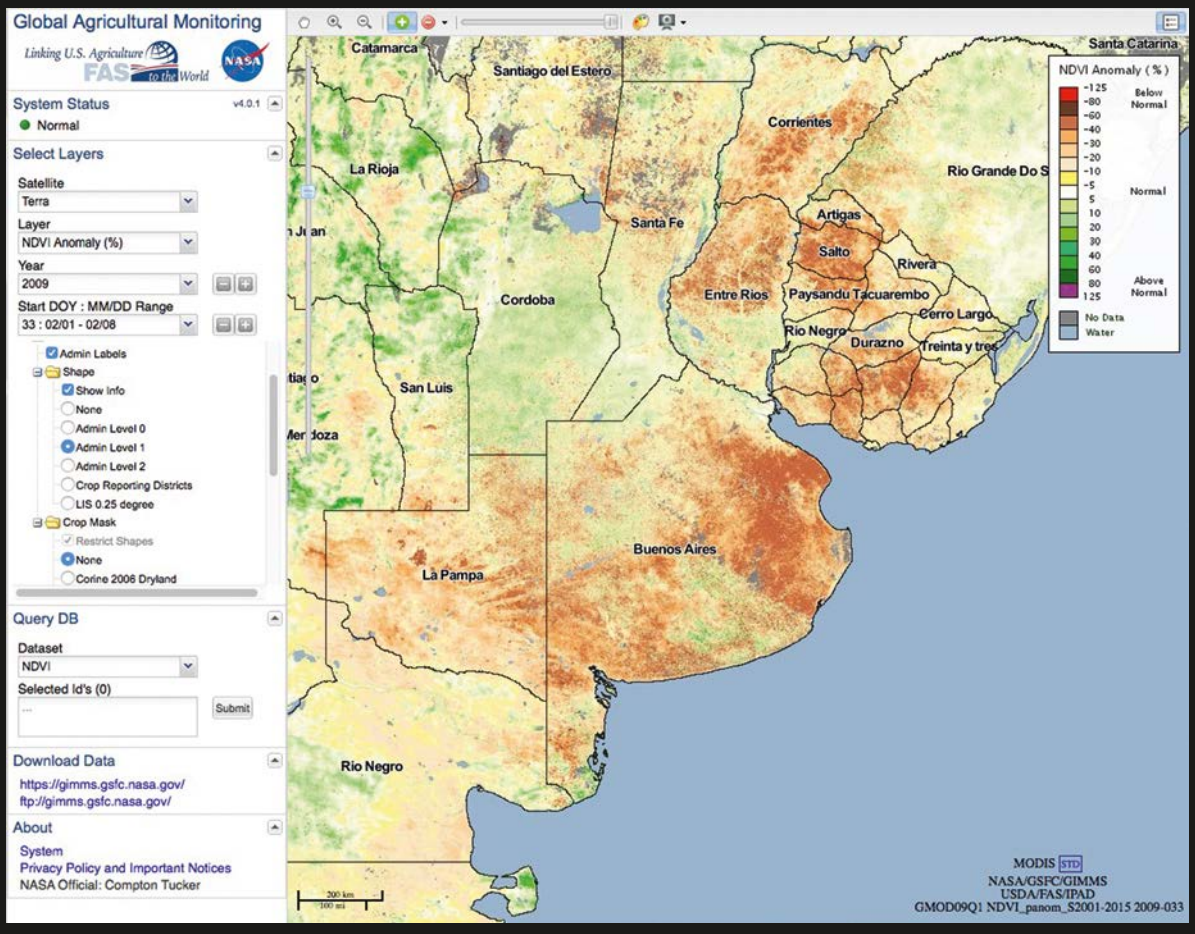
Claims handling service

In the medium term, Munich Re will focus on offering as a service its own insurance and claims expertise, along with solutions for automated identification of damage. Once the technologies are sufficiently established, and their reliability has been demonstrated, it would be possible to handle all of an insurer's claims management for natural catastrophes – including automated indemnification payments. The availability of pre- and post-loss data will provide more effective claims information, and may also help to prevent cases of fraud and the submission of duplicate claims. In addition, the data from the claims notifications will provide key information for underwriting. In collaboration with primary insurance clients, specific work on these kinds of solutions will be launched and expedited over the course of 2017. —



Loss detection: Modern remote-sensing systems help to define the areas affected by a natural catastrophe, and to identify and classify losses.

In 2009, Argentina experienced a catastrophic drought, bringing crop damage and livestock farming losses.



Drought and floods are substantial risks for the agricultural sector. Innovative solutions are called for in situations that are not covered by standard crop loss insurance. In collaboration with the ag-tech start-up S4, Munich Re has developed an agricultural cover that can automatically determine a loss with the help of satellite data.

Support from outer space

Ernst Bedacht, Senior Underwriter, Special and Financial Risks

Successful management of agriculture risks in farm production is becoming increasingly crucial. With an estimated global premium income of around US$ 30bn in 2016, and average annual growth rates of 20%, the volume of agriculture insurance has quadrupled since 2004. But in many instances, standard crop insurance and its method of determining each loss individually is simply not practicable. This is particularly true in emerging and developing countries, where there is no data for individual yield insurance, or the available data is not transparent enough.

In such situations, index covers based on a yield index or on weather index data offer a simple and inexpensive method of protection. For example, by using a rainfall index from a representative weather station to determine a loss, an insurance company saves costs on complex loss appraisal in the field and can compensate insureds much more quickly.

Innovative cover against drought losses

The use of remote-sensing systems opens up possibilities for entirely new product designs. Munich Re is collaborating in this area with the Argentinian start-up S4, which specialises in the ag-tech market. The company focuses on the development of data-based analysis tools for agriculture. The tools are intended to improve agricultural yield and manage risks more efficiently. When allied to insurance expertise from Munich Re, these tools can be put to an increasing number of uses. One example is an innovative solution with which soybean farmers in Argentina can protect themselves against the impact of drought. It was originally designed as a marketing instrument for a seed and herbicide manufacturer who wanted to refund the cost of seed to customers if their crops failed. This kind of protection is now opening up further areas of application.

A major obstacle in developing index-linked insurance products lies in obtaining reliable and customised data on the occurrence of a loss. To address this problem, S4 has established a vegetation index for different regions (counties) in Argentina. It was designed to ensure there was a high correlation with the yield, so that it would provide a good approximation of the actual soy harvest. The crucial factor for determining a loss is how this index develops in a particular county. If it is below a specified trigger, farmers in the county receive compensation, irrespective of the actual harvest situation in their fields. To make the cover as transparent as possible, the current values of the vegetation index for the different counties are published separately on the Rosario Futures Exchange (ROFEX).

Breaking new ground

The Enhanced Vegetation Index (EVI), which is based on satellite data and is published free of charge by the US space agency NASA, is used as the basis for the calculation. In practice, S4 reads the EVI for regions where soy is being grown, or has been grown. An unbroken sequence of data is available for the last 17 years in a spatial resolution of 250 x 250 metres. Vegetation indexes make use of a special feature of plant growth: the healthier (greener) a plant is, the higher its increase in reflectance in the spectral range from red to near-infrared. Munich Re and S4 have broken new ground with the index cover for soybean cultivation in Argentina. Until now, vegetation indexes had only been used for pasture, where determining yields is easier because in the case of grass, the biomass alone is the yield target. With field crops such as wheat, soy or corn on the other hand, the biomass is not an informative indicator for the harvest yield, for example because problems can arise during pollination.

Many obstacles to surmount

In order to develop a reliable product, a suitably long time series of satellite images needs to be compared with the actual harvest yields on the fields. One prerequisite for this is that the crop that has been planted is recognisable, which is only possible with a relatively high spatial resolution, in conjunction with the appropriate computing capacity.

Another important factor with index calculation is the point in the vegetation period when the satellite images were taken. There is little information in the EVI from the fields shortly after sowing. However, between four and eight weeks before the harvest, the plants are at the peak of their vegetation phase. At this stage, they provide a very good indicator of the forthcoming crop yield.

Argentina is the perfect market for satellite-based index insurance because soy is grown over large areas there. The situation is quite different in Mexico or India, for example, where different crops are planted in relatively small areas. In this case, any insurance relying on a vegetation index quickly reaches its limits due to the lack of informative data. A further drawback is that crop losses from hail, pests, inundation and storm surge that occur after the vegetation index has been determined are not considered with this cover. S4 therefore developed an additional flood trigger for the harvest period. This is also based on satellite data, and reflects the proportion of flooded land in a county. This means that the bulk of potential agriculture losses are now covered.

The project shows that innovation will come if you are open to new ideas.

What happens if the satellite breaks down?

One problem with remote sensing using satellites is the sudden failure of a system for which there is no quick replacement. Missing data on the progress of vegetation growth cannot be retrieved at a later date, so that alternatives need to be provided in this situation for index-based insurance products.

In the case of the Argentinian cover for soy, the data comes from two separate NASA satellites (Aqua and Terra with a moderate resolution imaging spectroradiometer – MODIS), which are highly unlikely to break down at the same time. But they have a limited life cycle because of the fuel required to correct their orbits. NASA currently believes there is a good chance that both satellites can continue to operate into the early 2020s. Due to technical advances, the successor or successors to the two satellites will feature different sensors, whose data cannot be directly compared with existing datasets. This will affect both the resolution and the areas of the Earth's surface that are regularly scanned. So at that point, recalibration of the existing time series will become an unavoidable necessity.

Fruitful collaboration

The cooperation with S4 proved beneficial for both sides right from the start. The project shows that innovation will come if you are open to new ideas. Especially for agriculture production risks, the combination of long-standing insurance expertise with the benefits of new technology and advancements in digitalisation is the perfect basis for successful risk solutions.

Cover for the soy crop in Argentina is now in its second season. There is also a pilot project in the USA for soy and corn. It is also hoped that the product can be expanded to Brazil, where there is significant market potential. Other potential target markets include Australia and Ukraine, where covers can also be sold directly through commodity traders and banks.

A crucial factor for the successful spread of trigger-based agriculture insurance is that the policyholders actually understand the way it operates and are clear about the unavoidable basis risk. Otherwise, insurers run the risk of being criticised or suffering a loss of reputation if they do not pay out in cases where the trigger did not come into effect despite individual crop losses. —

"In the early days, the pictures were still in black and white. But even back then, this publication was able to offer detailed loss analysis to help clients."

This year, Schadenspiegel is celebrating its 60th anniversary. It started out in 1957 reporting on losses in the fields of machinery breakdown and erection all risks insurance. Today, the magazine covers a wide range of subjects, from detailed reports on individual loss events to in-depth risk analysis. Tobias Büttner, Head of Claims at Munich Re, talked to two Schadenspiegel veterans, Detmar Heidenhain and Paul Einhell, about the early days of the publication.

From left to right:
Tobias Büttner, Paul Einhell and Detmar Heidenhain

Tobias Büttner Welcome Mr. Einhell and Mr. Heidenhain. We are very pleased to have this opportunity to talk to you about the history of Schadenspiegel. Sixty years ago, how did the idea first come about to bring out Schadenspiegel as a new publication?

Paul Einhell As machinery breakdown insurance was an important line back in the 1950s, company directors Gerathewohl and Waldemer first came up with the idea of a publication. To help with client acquisition and marketing, they wanted to provide primary insurers with something that really highlighted the need for this kind of insurance. They felt the ideal medium would be a printed publication with pictures illustrating losses and which, in contrast to other publications, also focused on technical aspects. I only became involved with Schadenspiegal after I joined the Engineering Department about seven years after it first came out, so I can only make an educated guess.

Detmar Heidenhain Loss adjusters were also very appreciative of Schadenspiegel. They found a lot of useful information for their work in the articles. Even though the initial focus was on machinery breakdown insurance, the loss spectrum was always wider than that. It included damage caused by miscalculating the dimensions of falsework during bridge construction, problems with installing oil tanks and the risks involved in driving an excavator over recently filled land.

Büttner How often did Schadenspiegel appear, and how was it produced?

Einhell To begin with, there were no fixed publication dates. We simply waited until enough interesting claims had accumulated in the different departments. We sometimes had to wait quite a while as we only featured settled claims so as not to interfere in ongoing cases. And there

2001—2016

To accompany this interview, we are highlighting nine major loss events that featured in various issues of Schadenspiegel.

2001

9/11

Ina Ebert,
Leading Expert, Global Clients/
North America

The attack on the World Trade Center in New York on 11 September 2001 led to a fundamental change in the perception of terrorist attacks. With thousands of people killed and the symbolic collapse of the two towers at the heart of the Western world – it was an entirely new dimension of threat. This was also the case for the insurance industry, whose risk models had never covered an event of this kind before.

9/11 remains one of the costliest loss complexes ever. Virtually all lines of insurance were affected, with insured losses totalling US$ 40bn. It took more than ten years to process the claims, even though the exceptional political situation in the USA meant that many liability claims were settled through government programmes. In particular, compensation for surviving dependants came almost exclusively from the Victim Compensation Fund administered by Ken Feinberg.

2001

Toulouse

Robert Schmid,
Senior Underwriter, Special and Financial Risks

On 21 September 2001, at 10.17 a.m. precisely, several explosions occurred in an ammonium nitrate storage facility not far from the centre of Toulouse. The blast wave caused massive damage to the facility and a total of 31 people died at the explosion site. Hundreds of passers-by and residents were injured by shards of flying glass. It is likely that material with an extremely high concentration of ammonium nitrate became mixed with other chemicals (such as engine oil from leaking transport vehicles) and was ignited by an unidentified heat source. The company's loss, which ran into the hundreds of millions, was far exceeded by the third-party loss. The treatment costs for the 2,500 people directly injured and for 14,000 people indirectly injured are also likely to have been higher than the property damage itself.

was no real editorial office to begin with. I was responsible for the publication for decades as a kind of one-man editorial team, and I wrote many of the articles myself. These were usually then passed on to the Chief Engineer for approval. It was only much later that we received any editorial support.

Heidenhain Over time, we also tried to persuade the underwriters responsible for a specific claim to write articles, which we then published under their own names. For the authors, it was a good way to make a name for themselves with colleagues and clients.

Einhell The appearance of Schadenspiegel has changed dramatically over the years. The first few issues had no cover picture at all. Then in the mid-1960s, we wanted to enhance the external impact of the publication and introduced a more attractive cover design. So the first cover picture arrived in 1966, still in black and white at that time. Then in the early 1970s, the pictures were produced in colour, and there was a good reason behind the change. During a fire loss in Austria, the high temperatures caused the reinforcing steel to melt. But you would have seen nothing of this effect on a black-and-white photograph.

Büttner Was there a separate Claims Department at that time, or did underwriters still have combined responsibility for underwriting, claims, risk inspection and maintaining client relations?

Heidenhain When I joined Munich Re in 1975, it was usual in Engineering for underwriters to handle individual claims. There was a sub-group that dealt with claims, but back then they used to say that whoever underwrote the risk should also settle the claim. That practice was later changed for governance reasons. A separate Claims Section had been set up in the Liability Department at a much earlier stage.

Büttner What type of major losses did you deal with in the early days of Schadenspiegel?

Heidenhain The main areas of focus were the engineering lines, in other words machinery and erection all risks. At the time, power plant claims, such as damage to turbines, could involve between 30 and 50 million deutschmarks and were considered major events.

Einhell Back then, losses from natural catastrophes did not play anywhere near as important a role as they do today, as very few were insured. It was not until Munich Re established its "Joint Office for Natural Hazards" in the mid-1970s that greater focus was placed on these risks.

2005

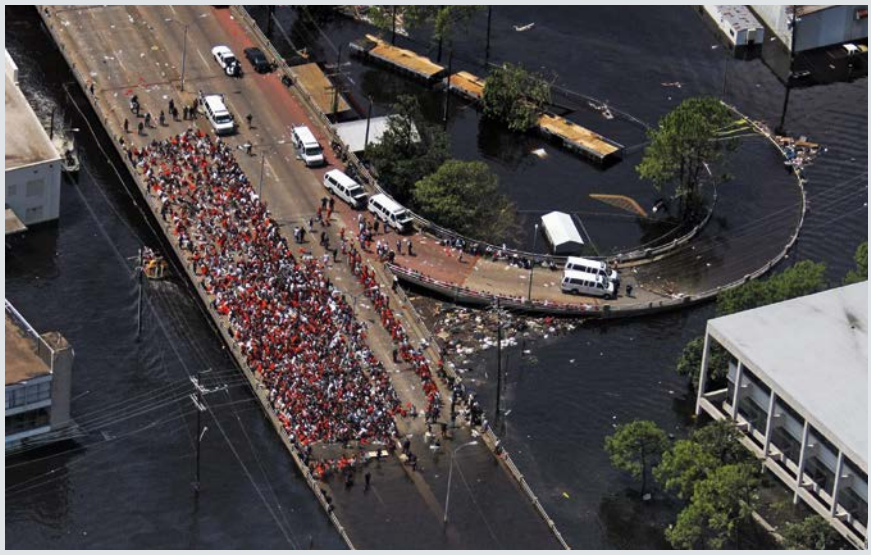
Madrid

Andrés Ruiz Feger,
Senior Claims Lawyer, Madrid

The "Edificio Windsor Fire", Madrid 2005: The fire started on the 21st floor, spreading quickly throughout the entire building. After approximately 18 hours of firefighting, the 32-storey building was totally destroyed. Ironically, weak links in the building's fire protection were being rectified in a refurbishment project at the time of the fire. Confusion regarding the firefighting strategy and the unsuccessful efforts of the fire brigade were the reasons for the catastrophic outcome. In insurance terms, another issue was the wide safety area set up around the building – an impediment to commercial activities, which increased the claims costs. It was the largest fire that Spain had ever witnessed and the first involving a skyscraper: a tragic reminder of the importance of building with fire-resistant materials. Despite the massive loss, there were at least two upsides: the demolition process was exemplary, concluded in less than six months, and collaboration between Munich Re and its clients was highly effective.

2005

Katrina



Klaus Wenselowski,
Head of Property Claims Management

In 2005, New Orleans was hit by Hurricane Katrina, one of the most devastating tropical cyclones ever and a humanitarian catastrophe that claimed the lives of more than a thousand of the city's inhabitants. Katrina made landfall near Miami on 25 August and in the days that followed moved towards the eastern portion of the Gulf of Mexico. Owing to the exceptionally warm ocean temperatures, Katrina quickly intensified to a category 5 hurricane with peak gusts of up to 340 km/h. Continuing at this strength, it then crossed over the oil production areas off the coast of Louisiana and Mississippi. Katrina was one of the most expensive cases ever for the insurance industry, with overall losses of US$ 125bn and an insured loss of US$ 60.5bn.

2005

Buncefield

Rainer Hanselmann,
Head of Casualty Claims Management (GC/NA & APAC)

On 11 December 2005, what was possibly the largest peacetime explosion ever to occur in Europe (2.4 on the Richter scale) took place at the Buncefield oil depot in England. Although the fire was contained mainly on site and there was no loss of life, the explosion caused tremendous damage. Overall losses came to approximately £1bn. On the property insurance side, it was mainly repair costs and consequential business interruption losses that had to be indemnified. Casualty-wise, the obvious subrogation targets were the joint venture operators of the depot. On 20 March 2009, the High Court finally confirmed liability for claims of around £700m. In total 3,545 claims had to be settled.

Büttner How have technical insurance covers changed over the years?

Heidenhain In the 1970s, Electronic Equipment Insurance was launched as the use of computers and electronic control systems began to spread. Munich Re wanted to get in early and offer a product that you could approach clients with, and which would open up reinsurance opportunities. Another innovative product was in the field of cooling systems – the DOS (Deterioration of Stock in Cold Storage) policy. With this cover, you could insure both the cooling equipment and any deterioration of products and foodstuffs in cold stores resulting from damage to the equipment.

Büttner Was Schadenspiegel partly conceived as a loss prevention tool?

Heidenhain Absolutely, but as well as Schadenspiegel we also had "Technology for Underwriters", another publication from the Engineering Department. It described the main risks and loss features, for example for certain kinds of machinery. Loss prevention was one of the principal aims behind this brochure, but it was also meant to assist underwriters when writing risks. Until it was discontinued, Technology for Underwriters was always included with Schadenspiegel as a supplement.

Büttner As well as underwriters and claims technicians, Schadenspiegel is also aimed at scientific institutes and organisations. At what point did the magazine open up to a wider readership?

Heidenhain Until the end of the 1960s, Schadenspiegel was only made available to Munich Re cedants. When Dr. Jannott became Chairman in 1969, a more relaxed approach was taken, and research institutes, industrial companies, brokers and experts were added to the mailing list. But only after a direct request had been received and with the express approval of Dr. Gerathewohl. In special cases, a personal letter was even attached from the Chairman of the Board of Management, Dr. Jannott. The fact that distribution was a management issue shows the importance the company attached to Schadenspiegel.

2010

Deepwater Horizon

Klaus Wenselowski,
Head of Property Claims Management

On 20 April 2010, an explosion on the "Deepwater Horizon" offshore oil rig in the Gulf of Mexico caused 11 fatalities, enormous property damage and a major environmental disaster. The oil leak from the rig lasted 87 days, spilling over 780 million litres of oil into the sea. According to official figures, the spill contaminated over 1,000 kilometres of the Gulf coastline. This catastrophe became one of the most expensive losses ever in the offshore energy sector.

2011

Fukushima

Andreas Langer,
Claims Manager

On 11 March 2011, the largest earthquake ever recorded in Japan shook the northeast of the country. The M_w 9.0 earthquake was the world's fourth-strongest in the last 100 years and triggered a 10-metre high tsunami, which led to the nuclear disaster at Fukushima. In contrast to the almost complete destruction in tsunami-affected areas, losses in other areas hit by the earthquake were moderate. Although Tokyo's skyscrapers swayed strongly for several minutes, there was no significant damage there. The earthquake claimed more than 15,800 lives, almost 6,000 were injured and over 3,400 remain unaccounted for. While the economic loss totalled more than US$ 200bn, insured losses were in the region of US$ 35bn to US$ 40bn.

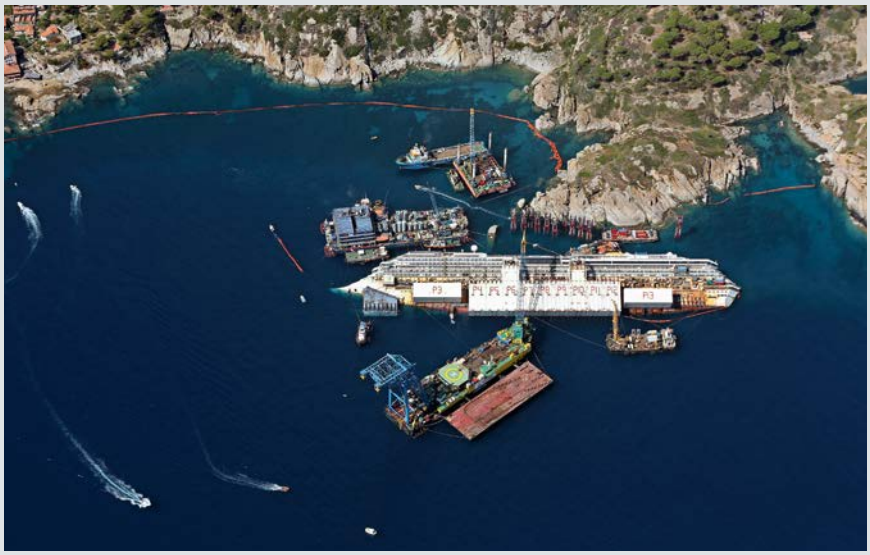
Büttner Even before I worked in Claims, I used to enjoy reading Schadenspiegel, simply because it took an in-depth look at important insurance issues. If you look at Schadenspiegel today, what is your general assessment?

Einhell It makes a welcome change from other Group publications in that it does more than just briefly outline loss events. The topics, i.e. the losses, are examined in detail and this provides experts with added value that would be very difficult or impossible to gain from other publications.

Heidenhain The aim today is still the same as it was then: to draw clients' attention to the potential risks in their portfolios. And at the same time, Munich Re wants to position itself as a partner that can both reduce the financial burden on primary insurers and assist them with tips and advice on claims assessment and processing. In that sense, Schadenspiegel is still providing a valuable service today. —

2012

Costa Concordia



Olaf Köberl,
Senior Claims Manager

When the Costa Concordia ran aground off the island of Giglio on 13 January 2012, it was set to become the biggest ever loss in the maritime insurance market. The reason for the accident was gross negligence on the part of the captain, who was sailing too close to the island, at too great a speed, and without proper maps.

With an overall loss of around US$ 2bn, the claim is unparalleled in the history of maritime insurance. Salvage and dismantling costs alone, which were met under the liability cover, amount to US$ 1.2bn. The reinsurance market will eventually shoulder more than 90% of the overall loss.

2016

Fort McMurray

Joachim Pawellek,
Manager Claims

On 1 May 2016, a wildfire started southwest of Fort McMurray, Alberta, sweeping through the community and forcing the largest wildfire evacuation in the Canadian province's history. It destroyed more than 2,400 buildings and spread across northern Alberta, threatening the Athabasca oil-sands operations before making its way towards the neighbouring province of Saskatchewan. This natural catastrophe is one of the costliest to have ever hit Canada, with insured losses of approximately Can$ 4bn.

In most cases – and with a bit of luck – the impact of a loss event is limited to the immediate surroundings and to insureds located just a few miles away. However, loss events in utility companies are usually an exception to this rule – they can easily impact whole countries and millions of people. But our example from Colombia shows that, with the help of some excellent work from an adjustment team, even a loss can be turned into a success story.

Achim Fehrmann, Senior Claims Manager

Back online in record time

Major losses

Hydroelectric power station in Colombia, 2016

Thanks to the excellent work of the adjustment team, the plant was back running at 100% after just 134 days.

A total of over 690 tons of freight was transported in eight flights using two Antonov aeroplanes.

Colombia's current installed electricity capacity is 16,594 MW, 66% of which is provided by hydropower. Due to the "El Niño" effect, a very dry season was expected in the region at the beginning of 2016. In order to store enough water in the country's reservoirs, and to bridge the weeks until the next rainy season arrived, providers of electrical energy responded early on by reducing hydropower generation.

However, when a fire broke out at a hydropower plant, the Colombian people still remembered the "El Niño" effects from 1992/1993, which led to reduced energy supply in many cities during peak hours, forcing people to live as they did 100 years ago and reducing the country's gross domestic product by 2–2.5%. Now, however, all the key players have learned their lessons: the government immediately implemented a national plan to reduce energy consumption, while the power supplier carried out the repairs in record time – successfully supported by its insurer and a very capable adjustment team. The outcome: there was very little negative impact on the country.

Insurance played a key role in providing the resources and experience to achieve this success.

Cable fire – Crippling a crucial part of an energy supply

The fire in the 230 kV cables of the hydroelectric power station severed the transmission of electricity from its turbines to the national grid. High-voltage cables transfer large volumes of electrical energy – in this instance from the transformers to the transmission lines via a 2 km-long tunnel. This installation comprised twelve oil-filled cables, each 2.3 km in length, and a 375-mm² conductor. Each cable had three sections separated by stop joints that provided oil by gravity feed along the cable. This particular design of paper laminate, hollow-core cable needs to be constantly saturated with oil to maintain the dielectric strength of the insulation. The cables were hung from the tunnel wall in four sets of three, and ran through the tunnel – which was also used for vehicle access, but this section was separated off with a non-combustible wall.

Fire rages for 14 hours

Some months before the loss, a cable oil leak was detected during a regular maintenance check. Because the leak was of insignificant size, the repair was postponed until the next scheduled repairs were conducted by specialised contractors. The repair works were duly carried out.

Just five minutes after the system was put into operation, a low-pressure alarm for the repaired cable was activated. Plant employees went to the tunnel and confirmed that the oil pressure was zero for this particular cable and reported it to the control room. An explosion occurred at the same time and all the electric protections were activated. The explosion took place at the stop joint of the repaired cable and was followed by a fire that directly affected 200 metres of the tunnel, impacting 100% of the power transmission capacity. The stop joint was the element located at the highest point on this cable section, so this was where the air that had entered during the repairs accumulated. The ensuing lack of insulation in the element generated an arc flash (or flashover), a very high-intensity electric current event that can reach 21,000°C, and which was followed by a rapid release of pressurised oil, resulting in a huge fire.

The explosion impacted other cable stop joints located in the same area and triggered arcing 2 km further up at the connection to the transmission lines, where adequate installations protected the rest of the interconnected system. Because of the difficulty in accessing the tunnel and the extremely high temperatures and huge amount of smoke produced by the burning oil, the fire was not extinguished for 14 hours.

Setting reconstruction into motion: Ingenuity is key

The repair plan was started immediately after the damage assessment had finished. Thanks to the electrical protections, damage was limited to the power cable system and all the cabling located inside the tunnel. Transformers and generators did not suffer any damage.

Initially, a scenario of almost a year being required to complete the repairs made it essential to start thinking about a temporary solution. However, this option was ruled out after consultation with experts because, due to the age of the cable, the brittle paper which is part of the insulation would have been prone to crack at the slightest movement, resulting in a higher risk for the plant if it were installed.

But thanks to the excellent work of the adjustment team, which conducted intensive research and contacted all the right parties, an option was found in Mexico, where 29 km of dry cable manufactured for a project in 2009 had been retained and was available. The cable capacity was double that of the damaged cables, but it was a technical fit and available immediately. Arrangements were quickly made to test the cable and have it shipped as fast as possible. Transportation of the 57 cable reels, plus the accessories and equipment needed, was a titanic task. Several detailed steps had to be considered if the approach was to succeed:

Major losses
Back online in record time

The correct supports first had to be manufactured to transport the reels and the correct elements selected to be included in each shipment. Then domestic logistics needed to be equipped to transport the reels from the plant to the departure airport in a busy city, and then move them from the arrival airport to the plant along a very narrow road. A total of over 690 tons of freight was transported in eight flights using two Antonov aeroplanes, special cargo transports which reduced the lead time to restore 25% of the plant's generation capacity to 68 days, 50% to 80 days, 75% to 121 days and 100% to 134 days. It was a resounding success considering that at least one year would otherwise have been needed to return to 100% production.

Munich Re's expertise in reinsuring enterprises for whom every single minute of business interruption costs thousands of dollars persuaded the adjustment team to consider and employ all resources available in order to reduce the critical path for the repair works – without losing sight of the interests of any of the parties involved. From the very first meetings, just after the replacement cables were found, Munich Re's experts strongly recommended checking the potential time and cost savings realisable by using Antonovs to speed up delivery of the reels. Furthermore, lessons learned from previous cases meant that our experts were fully aware of the need to start the design and construction of special reel frames as quickly as possible to facilitate transportation in such large aircraft.

Communication between the Colombian and Mexican governments was key to making the whole import process smooth, with normal customs procedures waived for this load to avoid any further delays.

The insurer served as a catalyst in accelerating the processes.

Insurance provided the resources and experience

Many questions arose during the adjustment process. This hydroelectric power station was the first in a chain of plants that mainly used the same water, and one of the others was owned by the same insured party. For various reasons, there was no siphon to let the water stored in the reservoir run down to be used in the other plants, which therefore impacted the generating ability downstream.

Although no energy was lost since no water was discharged, the insured party lost the opportunity to sell the energy at a higher price during the dry season in both plants, which of course affected its overall income during the period when the repairs were being conducted. There were no questions about coverage for this part of the loss. On the other hand, there was no doubt about the impact the loss had on the spot market. It pushed the price of energy up to the maximum level regulated by the government, affecting additional utilities throughout the entire market, including the insured party itself. But would it be possible to isolate the impact of a single power station on the spot market to calculate the "what if" scenario? Unfortunately, it was not.

A further issue was the valuation of the water that was not utilised during the repairs, but remained stored at the reservoir. The hydroelectric power station could ultimately have used this water to generate energy and would in theory thus have been able to reduce the loss. For this, the cover would have needed to have had provisions in the policy on this aspect and valuation methods enabling the calculation of the actual loss sustained.

The success in carrying out the repairs in a speedy manner and resuming electrical energy generation was the result of many different factors. The risk of a very long outage at this key power plant (which would have had serious consequences for the entire country) motivated the government and public authorities to work with the insurer to minimise the repair period. The insurer acted as a catalyst in accelerating certain processes, ensuring – for example – that repair contracts were quickly assigned and performed under the technical supervision of the insured. This process would normally have taken much longer.

The second key factor was having the correct adjustment team, which actually worked around the clock on restoring the insured party's capacity, by gathering experience from all possible sources, including the reinsurers, thereby enabling the loss to be turned into a success story. —

View of Drumlanrig Castle in Dumfries, Scotland, where a Leonardo de Vinci painting worth £40m was stolen in 2003. Police recovered "The Madonna of the Yarnwinder" from a solicitor's office in Glasgow.

Art insurance Scotland

A tale of one da Vinci, four art thieves and two costly gaps in cover

High-value works of art in private collections and museums are a prized target for criminals. Although the right art policy can ensure that the financial loss is covered if thieves do strike, there are a number of pitfalls to avoid, as this example from Scotland clearly shows.

Benjamin Knopf, Claims Manager

Facts of the case

Painting
Madonna of the Yarnwinder, oil on wood, painted between 1501 and 1510 – probably as a copy of a lost original

Artist
Original by Leonardo da Vinci, copy made by himself and his pupils

Estimated value of the painting
Between £25m and £40m

Timeline of an art robbery

27 August 2003
Art thieves steal a Leonardo da Vinci painting.

September 2003
The policyholder receives the maximum claims payment from the insurer.

July 2007
A lawyer contacts the insurance company. He wants to negotiate the return of the painting.

August to October 2007
Acting on behalf of the insurer, undercover police officers posing as the policyholder's representatives speak to the lawyer, who asks for £4.25m to be transferred to a Swiss bank account.

4 October 2007
Before the payment is made, the lawyer shows the undercover police officers the painting. The police intervene, arresting the lawyer and, soon afterwards, the private detectives. A total of five people are arrested.

In late August 2003, two men entered a public museum in a castle in Scotland that housed one of the United Kingdom's most valuable private art collections. One of the paintings on display was Leonardo da Vinci's Madonna of the Yarnwinder. This was what the two men had come for. One overpowered a guide while the other removed the painting. The thieves then escaped in a car with the help of two accomplices.

How art theft claims are settled

As the collection was insured against theft, the insurer immediately offered a reward for any information leading to the return of the painting. Following a speedy claims investigation, the owner received £3.8m in compensation, the maximum amount covered by the policy.

From the victim's perspective, however, this was not nearly enough, since estimates put the market value of the stolen painting at between £25m and £40m. This is where the first costly gap in cover arose. Because the sum insured for the art policy had never been adjusted, the amount paid in compensation fell considerably short of the stolen painting's market value. This example demonstrates that the value of an art collection should be reviewed regularly, and the sum insured adjusted to ensure full insurance coverage.

The value of an art collection should be reviewed regularly, and the sum insured adjusted to ensure full insurance coverage.

There are two reasons for this:

- The market value of art is subject to severe fluctuations
- In the event of a loss, the insured value – not the market value – is the determining factor for the amount of compensation paid

The Art Loss Register helps stop trade in stolen artworks

But the question remained: what could art thieves do with such a well-known painting as the Madonna of the Yarnwinder? After all, the spectacular theft was widely reported in the world media, making it almost impossible to sell the painting on the market for a long time. What is more, before purchasing a work of art, any prospective buyer can now check the Art Loss Register.

This is the world's largest database for stolen and missing works of art and was set up in 1991 by leading auction houses, insurance companies and art market associations. The database currently holds more than 300,000 entries. Since it was established, the Art Loss Register has been involved in recovering works of art worth around €230m. However, it played no active role in this case.

Owners need buy-back clauses to reacquire stolen artworks

The Madonna of the Yarnwinder resurfaced four years later, when two private detectives contacted the insurance company through a lawyer. The lawyer raised the possibility of arranging the return of the painting in exchange for a reward. Following this initial contact, the police were finally able to seize the painting and hand it back to its rightful owner: the insurer.

But how exactly did the painting come to be owned by the insurer, leading to the second gap in cover from the collector's point of view? The answer is simple: if an insurer pays indemnification for a stolen work of art, the title passes from the original owner to the insurance company. This becomes relevant if the stolen work is then found. Anyone wanting to guarantee calculable conditions for the return of a piece of art must take out a policy that includes a buy-back provision. This enables policyholders to regain ownership of a work of art that has been rediscovered in return for repayment of the compensation received.

Tragically, the original owner of the painting – the lord of the castle – died approximately a month before the police were able to secure its return, meaning that he did not live to see the Madonna of the Yarnwinder again. —

Batch claims in US medical malpractice

Damages paid in US medical malpractice cases are often extremely high. On top of the "standard" individual losses resulting from treatment errors, there have also been some unusual batch claims in recent times. As legal proceedings in such cases frequently involve a large number of plaintiffs, they usually take the form of a class action. The following three examples illustrate many of the legal issues involved.

Dr. Frank Hoffmann, Claims Manager

Case 1
Series of health injuries following CT radiation

Between 2008 and 2009, a hospital exposed patients with cerebral haemorrhages to excess radiation doses from CT machines. As a result, 206 patients suffered health damage. Of these, 82 filed suit against the CT manufacturers, their distributors and the hospital. The insured hospital reached a settlement with the plaintiffs, although legal fees and court costs were substantially more than the damages paid.

This was followed by a legal dispute between the hospital and its insurer over the application of the deductible: the hospital's management viewed the circumstances as a single loss event and therefore wanted to pay the deductible just once. The insurer took a different view – that each case of patient health damage was a separate loss event and multiple deductibles should therefore be applied. In the end, the parties agreed an out-of-court settlement.

Case 2
Over 600 unnecessary heart operations

The new head of the Cardiology Department at a US hospital performed heart operations on 600 patients involving stent implants that were not medically required. In each case, he justified the procedure on the grounds of blocked coronary arteries. The operations mainly improved the finances of the cardiologist and the hospital, while the patients had to carry the risk from the surgery.

The scandal was uncovered by an internal audit, after which the hospital informed the patients affected. In 2014, it was revealed that the compensation claims from almost all plaintiffs had been settled for US$ 37m. From the perspective of the insurers, this was a relatively favourable outcome from the dispute. The plaintiffs would probably have received much higher compensation from a US jury. The doctor consistently disputed any errors in treatment, but his licence was still revoked.

Case 3
Hospital physician secretly photographed patients

A gynaecologist had been working for 25 years in the insured hospital when it emerged in 2013 that he was making intimate recordings of patients using a ballpoint pen camera. The doctor was instantly dismissed and committed suicide soon afterwards. An internal review found that the physician had been making secret recordings for years with his private camera, had stored them electronically, but not distributed them. The hospital then called in the police.

The results of the investigation showed that the doctor had stored more than 1,000 video and 140 image files. Almost 1,000 women were involved, 67 of them under age. None of the victims had been aware of the recordings. In line with legal requirements in the USA, the patients had to be informed of the investigation results. In October 2013, a class action was then brought against the insured hospital. Mediation proceedings also started in 2014, in which the plaintiffs demanded compensation payments up to the policy limit of US$ 224m.

Had the doctor still been acting in a contractual capacity, or were his actions not attributable in any way to the hospital?

The defence could have argued that the doctor's indecent activities had been performed outside the context of his employment contract. Yet at the same time, these "treatments" had been invoiced. In addition, there were circumstances in the course of the employment relationship that ought to have led to reviews, such as treatment outside normal working hours without an appointment, etc. Yet no action was ever taken.

Assuming liability on the part of the hospital, what should have been the amount of the patients' claims?

Determining an appropriate sum in compensation proved especially difficult. The lawyer for the plaintiffs is reported to have estimated the total claims at more than US$ 1bn. Even the defence lawyer arrived at a sum totalling hundreds of millions. Comparable cases and test surveys of jurors revealed that compensation of US$ 175,000 per patient was considered appropriate. The defence therefore agreed to a settlement of almost US$ 200m. This meant that the complex and painful process of identifying the patients affected was no longer necessary.

The bottom line

Despite the different circumstances of these three cases, each one shows that, particularly with large hospitals, loss scenarios that far exceed the standard loss pattern for medical malpractice may be expected. Insurers face major risks in this context that call for specialised expertise and the relevant experience, both in underwriting and in claims management.

Robert Popp, Claims Manager

Planners and construction firms liable

For a number of years, the risk of being held liable for inadequate construction planning and execution, for example in relation to thermal insulation, has been steadily rising. The insurance industry is called upon to develop sustainable solutions, including concepts that go beyond legally required insurance.

In the course of deregulation, governments in many European countries have simplified the procedural side of realising construction projects. In the past, obtaining a building permit from the public authorities could be an expensive and time-consuming business. In many countries today, however, all that is often required is a notification to the responsible authority based on private audit certificates from accredited experts. In Germany, for example, a full official permit is generally only prescribed for particular buildings, such as schools, hospitals or tower blocks above 22 metres.

Even though the building application process can still differ significantly between individual European coun-

Above:
Large construction projects in particular involve a risk of change resulting from the development of new kinds of building materials, the liberalisation of building regulations and construction supervision, and the digital transformation of the construction industry.

Left:
Exterior insulation is of key importance in building projects.

tries, there is an unmistakable trend: the authorities everywhere are striving to streamline procedures and placing much greater emphasis on the duties and obligations of the construction industry.

Government responsibility transferred to the private sector

If a full building permit is no longer needed, a "qualified design consultant" (usually an architect or civil engineer) is responsible for ensuring the project meets all public-law requirements. In other words, the planner is responsible for ensuring compliance with the relevant regulations and accepted engineering standards, for example in relation to fire protection, thermal insulation and soundproofing. This is frequently backed up by the role of site managers. During the execution phase, they are officially authorised to ensure that the work is carried out in accordance with the construction plan, and in compliance with building and accident prevention regulations.

The threat of increased liability claims under civil law looms if it transpires that planning or execution does not comply with legal regulations. In the absence of an official supervisory body, private construction firms are now the only parties liable if principals demand compensation for additional costs due to construction errors. As a rule, architects and engineers who act as qualified design consultants are therefore also subject to compulsory insurance, which

Planners and construction firms liable

stipulates a minimum sum insured and sets out possible exclusions. A look at the statistics indicates just how necessary this cover is: the risks of being held liable for inadequate construction planning and execution have been rising for years now.

According to a study by the German Institute for Construction Research (Institut für Bauforschung), there was a five-fold increase in the number of claims in the building sector between 2002 and 2013, while over the same period, total turnover in the construction industry increased by just 10%. An assessment of almost 5,000 professional liability claims relating to structural damage formed the basis of the study. According to a conservative estimate, the average costs for damage to buildings more than doubled, from €33,000 to €67,000.

Thermal insulation a source of defects

Claims in connection with thermal insulation are becoming a particular problem. Since 2005, the number of claims reported has been increasing following amendments to the German Energy Saving Ordinance (EnEV) and the introduction of energy performance certificates, which have seen the requirements for thermal insulation systems become progressively stricter. Increasing uses are being found for new kinds of technology that require ongoing training and highly qualified specialist planners and installers.

The trend towards more thermal insulation and associated claims is likely to continue: under the 2010 EU Buildings Directive, from the year 2021 all new buildings will have to be constructed as nearly zero-energy buildings. The objective is to reduce energy dependence and avoid harmful greenhouse gas emissions. After all, buildings account for roughly 40% of total energy consumption in the EU.

Damp and mould

Claims relating to insulation can arise because of planning deficits, as well as defective construction work, for example when retrofitting an outer wall and failing to avoid thermal bridges. Vapour in the air condenses on the point in the interior that is colder in comparison with the surroundings, and is then deposited as moisture on the wall. It is only a question of time until mould develops, given that the widespread practice of heating buildings via heated ambient air (convection heating) results in inadequate thermal distribution on the insides of exterior walls.

The risks of being held liable for inadequate construction planning and execution have been rising for years now.

In many respects, a radical rethink of the concept of thermal distribution and storage towards a system of radiant heat would be of long-term benefit:

- With the principle of what is known as "*Temperierung*" (heating of the building envelope), for example through a skirting heater along the outer walls, the wall gives off the supplied energy in the form of radiant heat. The masonry stays dry even under unfavourable conditions, and the radiant heat ensures a pleasant room climate because it does not involve the dust-laden room air cylinder featured in standard heaters.

- This would simultaneously reduce losses in ventilation heat, since the transfer of heat does not take place through the air in the room, but by radiation directly onto the material. This means the temperature can be kept lower than is the case with convection heating, which in turn improves the ventilation behaviour of users (no overheated rooms).

Problems with thermal insulation systems

A further source of error stems from hermetically sealing structures with the good intention of reducing energy losses. For example, the German Energy Saving Ordinance rather controversially prescribes an impermeable building envelope for new buildings. Establishing an airtight layer over a flat surface is a relatively simple matter, but it becomes a much more difficult task at overlap points and joints, and where different materials come together. This can lead to structural damage.

Thermal insulation systems from expanded polystyrene (EPS) pose a more alarming risk, as they can actually act as fire accelerants under certain circumstances (see Schadenspiegel 1/2013). The material, which is sold under different brand names such as Styrofoam®, is an inexpensive type of insulating material produced from crude oil that is easy to process.

Despite the fact that the material is subject to strict legal requirements regarding its fire behaviour, EPS, with suitable flame retardants as additives, meets the requirements for building material class B1 (not easily flammable). This class means a fire must remain locally contained even under the influence of a major source of ignition. At the same time, the dioxins contained in the flame retardants represent a hitherto unsolved problem in terms of the environmental compatibility of these construction products.

From the perspective of property insurance – e.g. hail risk – this exterior thermal insulation has proved particularly prone to losses: this is because the plaster finish applied to reinforcement fabric in thermal insulation systems is much thinner than on standard façades and has a correspondingly lower resistance to hail. As a result, hail produces an extensive and striking loss pattern with numerous impact holes and chipped plaster areas (see Schadenspiegel 2/2014).

Fire from botched construction work

Above a specific insulation material thickness, the "not easily flammable" classification is only awarded if a non-flammable lintel made from mineral wool is installed above each façade aperture (windows, doors). This is intended to stop flames penetrating the insulating material. Alternatively, what are known as fire locks can be installed over the entire façade. Since EPS-based thermal insulation systems can only provide a high degree of safety if they are certified and properly installed, lack of supervision during construction and poor workmanship on the installation of fire locks or lintels pose a risk that should not be underestimated.

The best protection against construction defects and planning errors is to engage competent planners, tradespeople and site managers with appropriate, documented experience – both professional and environmental – and to continuously monitor the quality of execution. For third-party liability insurers of building professionals, it is essential to counter the increasing loss trend with coverage concepts that truly reflect the risks involved. In the field of compulsory insurance, there is often little scope for this, given that the minimum sums insured and coverage details are prescribed by the government. In major projects, where the principal requests higher sums insured than those prescribed by law, the policy design options available are that much greater. They should be used accordingly in view of the fact that repairing damage is a costly business, particularly in the construction sector.

Insurers' expertise called for

In the area of risk management, the potential influence insurance companies can bring to bear on compulsory third-party insurance is also more restricted than in property insurance, where exclusions can be used to avoid covering specific building techniques, either partially or entirely. Insurers must also live with the risk of change relating to the development of new kinds of building materials, the liberalisation of building regulations and construction supervision, and increasingly, the digital transformation of the construction industry. Based on their breadth of loss experience on a national and international level, insurers must identify unwelcome structural trends and inadequate (control) mechanisms, so as to avoid or minimise long-term negative effects on the industry.

Their expertise in the area of risk assessment and their loss experience is invaluable in this context. Embedded for many years, as they are, in an international and multidisciplinary knowledge community, this offers the best opportunity to identify trends that could have negative consequences for the industry. Ideally, covers will be developed in the course of this process for which there have previously been no private sector solutions, something that would be of benefit for everyone involved.

Particularly in times of mass migration and consequent housing shortages, the insurance industry is duty-bound to highlight the prerequisites for the insurability of construction risks. This task is likely to gain in importance given the difficult balance between the long-term strong demand for affordable accommodation on the one hand, and fundamental requirements for professional and construction standards. —

Digital data analysis supports traditional claims management

Tobias Büttner, Head of Claims

Claims management has undergone major changes since Schadenspiegel first appeared 60 years ago. Nowadays, it is not just about the purely technical aspect of processing claims but about providing a wide spectrum of services, ranging from loss prevention to digital claims analysis. Nevertheless, solid claims processing remains as indispensable as it ever was.

Today, new technologies support claims management in a variety of ways. Sensors can identify risks at an early stage, thereby helping to minimise losses or prevent them entirely. In the aftermath of natural disasters, drones can help to quickly determine the scale of damage. Digital collection and analysis of data makes it possible to take quick, dependable decisions instead of having to rely on subjective estimates, as was frequently the case in the past. Consolidated, central databases ensure greater transparency and highlight loss trends. Robust risk and loss forecasts are now possible much earlier. Not only does this make it easier to identify errors, but also to learn from losses and prevent such errors in the future. Last but not least, claims processing is becoming faster and in many cases less expensive, something that should go a long way to increasing insurance client satisfaction.

Needless to say, these new aspects of claims management also present new kinds of challenges for the people working in this area. Apart from claims managers in the traditional sense of the word, a whole range of other experts, such as data analysts, will increasingly be involved. Most of all, aspects such as interdisciplinary cooperation, transparent communication and effective coordination of the different activities will continue to grow in importance. This is also – or even especially – true when it comes to cooperation with actors from outside the insurance industry, like competent authorities or those involved in the rescue services at the site of the loss.

Today, new technologies support claims management in a variety of ways.

Yet despite all the enthusiasm for the many different possibilities emerging from the use of big data and new technologies, three things should not be forgotten: firstly, the volume of data available for analysis has already assumed immense proportions. It is therefore critical to maintain an overview and to develop appropriate methods for filtering the relevant data as effectively as possible from the enormous quantity available. Secondly, in today's networked world, the ever-present issues of data security and data protection are clearly highly relevant for claims management. Solutions need to be found which allow the data to be used, while ensuring the highest possible level of data security and full compliance with data protection requirements on the part of everyone involved. This may well prove one of the biggest challenges over the next few years. Finally, and most importantly, use of these new technologies must only ever be seen as a way of improving, but never replacing, the sound, tried-and-tested practice of claims processing. This is true today, and is unlikely to be any different in 60 years' time.

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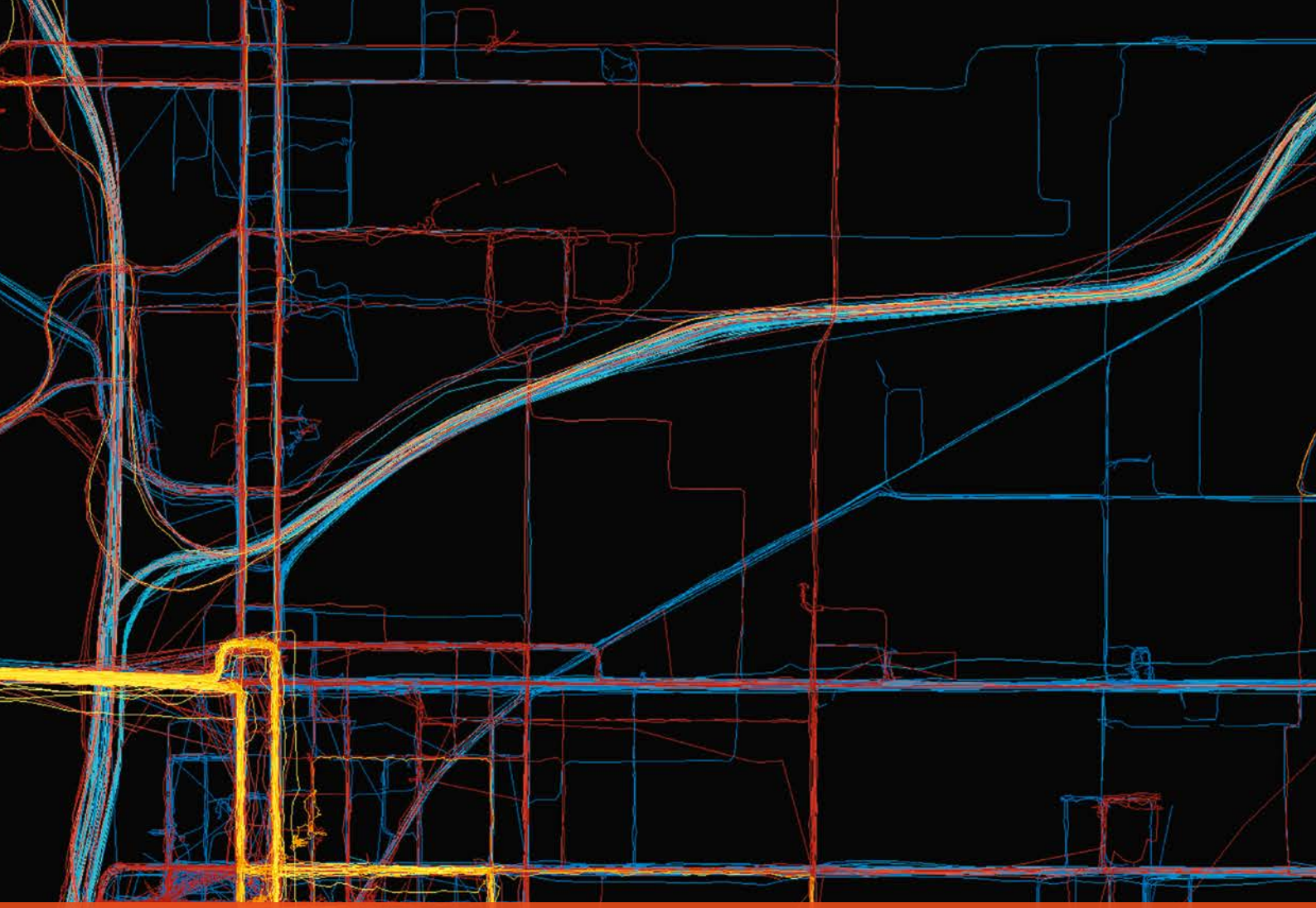

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