

AIM: the next generation

**Gaurav Siinigh,
ROSEN Group,
Europe, discusses
the benefits of a
flexible, cloud-
based approach
to asset integrity
management.**

Asset integrity management is like hiking in rough terrain: the fewer the uncertainties, the faster and safer the way to the destination. In the pipeline industry, the desired destinations or goals that unite the entire industry are the pursuit of “zero incidents” and achieving “net zero” emissions by 2050. But there are challenges, such as evolving asset regulations, missing or incorrect data, data discovery and traceability, climate change, and ageing assets (operational as well as human assets). ISO 55000 is one of many internationally recognised asset management standards that highlight the role of a systematic approach towards asset management systems and how they can be adapted by a software platform to address some of these challenges.

A holistic approach to asset management and integrity requires the ability to align and visualise many different types of data taken from a reliable “system of record” and adaptable asset integrity management (AIM) processes. In simple terms, we understand that operators need to look at data to understand the situation today, complete calculations to inform decisions and predict what may be needed in the future, and keep records. Therefore, we dedicate our technical and engineering expertise to empowering operators around the world to overcome the aforementioned challenges. We do so by developing NIMA as ROSEN’s digital solution for clients’ AIM needs.

NIMA is a flexible platform that delivers a comprehensive set of tools enabling data alignment (overlays), data visualisation and data storage in a way that contributes to better decision-making for both regulatory compliance and wider integrity management processes. The clear visualisations also help to strengthen confidence in the accuracy and completeness of the data.

Figure 1 shows that once the inspection data/results are acquired, they can be uploaded to NIMA for checking, alignment, visualisation and executing integrity-specific assessments. One of the great benefits of software-as-a-service (SaaS) is that multiple users can work on the same system from different locations. In these times of distributed teams – and increasing collaboration between customers and service providers – this SaaS approach enhances flexibility.

When teams are stretched or resources limited, operators can get expert support on demand to complete integrity processes, allowing them to focus on making the critical decisions. We understand that not all users/operators need the same level of assistance; this will depend on the resources available in the organisation, the level of experience and the particular skillsets. Hence,

we believe they need a platform like NIMA to provide flexibility in implementing AIM processes that can be scaled up as needed and promote a comprehensive approach as described in the pipeline integrity framework.¹

NIMA SaaS solution

Advancements in inline inspection technology and aboveground survey technology have led to vast amounts of data being generated (terabytes of data) and delivered to operators' offices. Thanks to fast internet options, the data can be shared with integrity or in-field engineers with the click of a button. However, the problem is that today the majority of this data resides in silos, meaning in individual or network distributed file folders or systems and in different formats. When one needs this data, it becomes a daunting task for the engineers to trace it back, check it and align it, which raises the question of how to overcome this data impasse?

We work with distributed multilingual (Russian, Ukrainian, Spanish, German, Dutch, English etc.) teams who collaborate to support operators worldwide. Our direct experience is that a digital solution that allows all the data for a particular pipeline to be checked, aligned and stored in a robust industry standard data structure where it is available for visualisation and assessment from any location improves efficiency and effectiveness.



Figure 1. Simplified NIMA SaaS workflow.



Figure 2. Integrity sheets template showing a holistic view of aligned inspection and other relevant data.

PROCESS MONITOR

Project	Process Step	User	Status	Requested	Queued	Started	Ended	Type
Fitness for Service...	FFS Assessment Execution		Finished	5/5/2021 3:53:37 PM	5/5/2021 3:53:38 PM	5/5/2021 3:57:24 PM	5/5/2021 3:59:37 PM	Process Step Template
Fitness for Service...	FFS Rstreq Calculation		Finished	5/5/2021 3:53:37 PM	5/5/2021 3:53:38 PM	5/5/2021 3:57:11 PM	5/5/2021 3:57:24 PM	Process Step Template
Fitness for Service...	FFS Rstreq River Bottom Profile		Finished	5/5/2021 3:53:37 PM	5/5/2021 3:53:38 PM	5/5/2021 3:57:08 PM	5/5/2021 3:57:11 PM	Process Step Template

Figure 3. Process monitor view.

Through our SaaS-based integrity platform, NIMA, we provide comprehensive alignment and assessment tools for your assets – available at your fingertips at any time and supported by ROSEN experts if and when needed. The SaaS-based solution also provides the benefits of implementing a “system of record” for the inspection and assessment history by providing easily accessible, structured, consistent and fully aligned datasets as a fundamental prerequisite. Additionally, it fulfills the regulatory requirement that demands all asset records be traceable, verifiable and complete.

NIMA offers operators a way to reduce uncertainties in integrity management processes and therefore aids in the decision-making process by providing:

- Quick and easy data alignment.
- Comprehensive visualisations.
- Fitness-for-service assessment.
- Corrosion growth.
- Repair planning.
- Risk assessment.
- High-quality data structures.

There are some inherent benefits of SaaS-based offerings compared to on-premise ones:

- Only operational expenditure (OPEX) of subscription fees that can be modified based on clients' needs. Also available in pay-as-use model. So no high investments in IT infrastructure and resources (CAPEX) needed on client side.
- Multi-vendor ILI data integration and assessment data following inspection services.
- Simple sharing and outsourcing of both data management and integrity assessment tasks.
- Access to ROSEN experts for remote integrity assessment and data management support.
- Immediate access from any device from any location.
- No software installation, third-party licenses or hardware infrastructure updates.
- Platform and process updates as well as bug fixes and/or enhancements immediately available.

- Data backups organised as per client wishes.
- Fully encrypted data transactions.
- Two-factor authentication.

Figure 4. Assessment compliance and metadata.



Figure 5. NIMA SaaS options.

Process library

Integrity assessments are processes that are either established by international organisations such as ASME, API, NACE (e.g. ASME B31.G assessment processes for corrosion defects); by local regulation (e.g. DSTU fatigue assessment and GOST assessment code, PHMSA process for selecting anomaly responses); or by individual companies (e.g. risk assessment processes).

We have captured the logic of the processes that are widely used in integrity management and represent current best practices in “process templates” (or applications). Using the SaaS platform, operators deploy these process templates as and when needed, providing them not only with great flexibility in the application of integrity-related processes but also with a means of keeping a check on their operational budget when using such digital solutions.

Process templates cover the repetitive steps that should be followed to apply relevant integrity algorithms. Implementing the use of process templates with your data ensures repeatability and consistency when viewing and analysing. The process-based design ensures that the integrity engineer follows well-defined steps to generate meaningful results.

To complete industry best-practice integrity assessments, operators have the choice of either using the pre-defined process templates, which we also use, or creating ones of their own, depending upon the subscription model selected. Within each process step, the user has to take complete actions, such as selecting the data needed for assessment, then carrying out the calculations and then visualising the results. In the following

section, we will highlight some of the visualisation aspects of templates, how data can be used to provide insights and how operators can be compliance-ready.

Data to insight to compliance-ready

Collecting and storing data is an important part of integrity management, but of course the real value comes in using that data to understand the condition of a pipeline and gain insights into the reasons for any issues or the significance of particular features.

The simple act of visualising data in alignment with other datasets and being able to filter the information most relevant to the decision-makers is extraordinarily powerful in helping integrity engineers to understand a situation and communicate with their colleagues in clear and understandable ways. It is very true that a picture is worth a thousand words. The level of information that one needs to visualise differs by everyone’s role, from analysts to integrity and operation engineers to members of the management team.

Figure 2 shows a simple example of how multiple types of relevant data can be visualised in alignment with each other. Showing the geolocation of the pipeline and its assets (valves, joints, markers, casings, anomalies), the map view helps to locate assets in a GIS environment. The second chart shows the anomaly depth vs. the log distance from the most recent and previous inspection. The third view shows the cathodic protection readings (Potential ON and OFF) on the left Y-axis; on the right Y-axis is the corrosion growth rate throughout the log

distance of the pipeline. And the last view makes it possible to visualise the reference data in a band view. On the right-hand side are the various options that adjust dynamically based on user selection.

NIMA’s ability to view pipe tally and integrity data in one dashboard with the power of visualisation on the map and dynamic selection shows the level of ease and flexibility that NIMA can provide. Managing data in this way aids in running operation-critical integrity-related processes, such as corrosion growth assessment, fitness-for-purpose analysis, repair planning and risk assessment (RBI) – all in full compliance with industry best practices.

Another important functionality of NIMA is the ability to monitor the processes (Figure 3), which allows superusers to keep track of who has done what, when and how, thus covering the data and assessment traceability aspect. Furthermore, from an internal compliance point of view, having the functionality that allows users to follow the approval workflow of assessment readiness – whether they are in draft mode (meaning to be checked) or released (after having been checked by the expert or decision-maker) – and then lock them so that they are saved for a specific section as a snapshot assessment in time adds the new dimension of confidence that assessments are thoroughly checked based on robust workflows and all metadata is saved in one location. Following this workflow supports the management of change processes or quality management as referred in ISO55001 [2], which directly or indirectly helps asset managers in assuring their operating license.

Once more, combining assessments with the data and its metadata with the possibility to use the results with other assessments allows for maximum utilisation and output with minimal operational costs. In the following section, we will outline what SaaS options are available.

Leveraging NIMA SaaS options

NIMA SaaS offers a very flexible approach for operators to exploit to the best of their abilities. NIMA offerings are designed in such a way that the needs of small, medium and large operators can be fulfilled. Operators can choose the option they think is best for them, and they can scale up or down from the chosen option.

Essential

View and interact with inspection and integrity assessment results. Use essential NIMA Process Templates to run fully featured applications such as fitness-for-service (FFS) and corrosion growth assessment (CGA).

Professional

In addition to the features of the “essential” level, access additional NIMA process templates for your asset integrity management (such as repair planning and more) and have the option of customised NIMA process templates provided by ROSEN.

Expert

The fully integrated integrity management solution. In addition to the features of the “professional” level, functionality for the user to configure NIMA process templates via the built-in

NIMA process builder, KPI overview in management operations dashboard, etc.

We make available to operators a secure decision-making framework by providing a digital reflection of individual integrity management processes, easy access to all necessary data and the flexibility to develop customised analytical tools. Furthermore, using SaaS for asset integrity management provides a flexible yet secure way of working from anywhere and from any device.

Summary

In a nutshell, we can say that the option of a phase-based approach based on the distinct needs of each operator can be easily delivered via a SaaS-based solution that can be scaled up as and when changes are needed. Because we talked about using a platform, it is imperative to mention that, unlike software systems that come with fixed modules and a set of data inputs, the NIMA platform is flexible enough to handle data from any legacy system or from other PIMS solutions available at the operator's office. A bespoke solution towards each client's needs can also be delivered. Our global technical expertise with local multilingual support closer to the client helps to provide fast solutions with a shortened turnaround time. 

References

1. Roy van Elteren et al. (Pipeline Technology Conference 2020), “Mind the Gap!” – Pipeline Integrity Framework.
2. ISO 55000 Asset Management – Overview, principles and terminology.
3. ISO 55001 Asset Management – Management Systems – Requirements, Section 7.5 and Section 8.1.