Signol Proposal

What is Signol

Signol is a software and proactive communication service that uses the latest behavioral science to motivate and influence key decision-makers in transport operations to consistently implement sustainable best practices.

By framing this feedback with behaviorally informed nudges and incentives, Signol can generate measurable changes in behavior. In aviation, this has significantly improved fuel efficiency, carbon emissions, and job satisfaction amongst captains. Our <u>initial academic trial</u> with 335 captains at Virgin Atlantic Airways saved over \$6 million in fuel costs and 24,000 metric tons (mt) of CO_2 in just 8 months. This was the lowest ever measured carbon abatement cost in any industry. In addition, captains also reported higher levels of job satisfaction.

The Proposed Project

Signol has received support from the Guy's and St Thomas' Charity to fund a trial of Signol's software on construction vehicles (road and/or plant) operating in the London boroughs of Lambeth and Southwark. The goal is to test whether Signol's feedback can motivate vehicle and plant operators to operate more efficiently and thus improve air quality (NOx, SOx and PMs) in those boroughs.

Singol intends to perform an academically verified randomised control trial (similar to our Virgin Airways trial) in order to demonstrate the power of Signol's techniques. We are currently seeking contractor partners to take part in the trial.

The Benefits and Outcomes

A new, verified solution for combatting urban air pollution from road and construction vehicles that can be rapidly scaled.

For Keltbray / Grosvenor directly:

- Signol would publicise the results of this work in its future activities. This would generate positive PR for Keltbray and Grosvenor.
- Positioning of both companies as world-leading in the field of operations research, especially with issues of pollution.
- A reduction (~1%) of annual operating costs (fuel).
- An effective and powerful tool to support Keltbray's sustainability initiatives.
- Improved well being and job satisfaction of employees.

Changing human behaviour is hard, but, when done well, it can be the most cost-effective way of reducing waste of valuable resources. In a feasibility study with Highways England, Signol demonstrated the potential for significant fuel and emissions savings (10-18% reduction in idling alone). This would equate to an annual reduction of between 349 to 632 It of fuel on average per HGV.

Signol

5

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SFO

69

59

55

UHR > PVG VS250

LHR > DEL

69

LHR > PVG

58

UNFALGW

501

V5250

NB > LHR

07LG-

LHR > LAX

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Little changes stack up

All-Time Person

Highlights

Taxi

36%

500 mT

24Kmi

2020

Reduced Engine Toxi In

140 mi

Reduced Engine Toxi Out Efficient Flight

carbon savings

4722mT

Signol:

A personalized communication service connecting skilled operators to the direct impact of their actions, driving them to make **measurable** energy and CO2 savings.



signol.io



Messages with Results

Using the latest behavioral science, Signol motivates skilled operators to **consistently** implement operational best practices.

And when skilled operators see the results of their efforts, it makes them happier with their jobs.

Motivating captains at

virgin atlantic

Behavior Implementation as % of flights



335 captains immediately improved and maintained their fuel saving practices with our feedback.



Example Road Transport Behaviors Signol Could Change



Wasted Idling

Turn off engines when the vehicle is stationary and/or not in use



Steady speed

Cruise at a speed that gives the best fuel efficiency for vehicle



Excessive speeding

Greater speed consumes greater amounts of fuel



Mileage optimization

Reduce travel distance by choosing a shorter route



Harsh braking & acceleration

Create opportunities for fuel-efficient gliding



Vehicle maintenance

Undertake routine or preventative maintenance to preserve vehicle

How does Signol work in practice?



We plug your operational data, in any format*, into Signol

Signol creates personalized targets and feedback for skilled operators Signol pushes this feedback to skilled operators, using **behavioral science,** to improve **performance and** well-being We ensure **continuous improvement** by **optimizing communications** for each individual Pilots are notoriously difficult to coach and **resist oversight**, but **love to see how they're doing** on **Signol**

This is just fantastic, I like seeing the savings and the donations... and how much fuel I've actually saved.

First Officer

We use statistical fuel, and people...don't like being told what to do, they don't want people to beat them up, so nudging people is the only answer. I'm more convinced by the concept than ever, it's a really interesting way to do it.

Head of Safety + Captain

Captain

Keeping data private and safe is at the heart of our product

We follow IFALPA and National Aviation Authority Standards.

We do not rank skilled operators.

Skilled operators can choose not to use Signol and have their data removed.

We do not present personally identifying data to managers.





19POS18

11 December 2019

Pilot Self-Assessment Systems

BACKGROUND

Several airlines have recently been introducing software and tools produced by commercial third parties that enable flight crews to assess their own performance after every flight, based on FDM-derived data. There are differences in the way each of these tools work, how the flight is displayed (graphics, animations, etc.), and how data is transmitted to individual pilots and on which support (smart phone, tablet, PC, etc.), but the general idea conveyed by airlines is that such systems enable flight crews to review their last flight and identify possible areas of improvement.

Whilst IFALPA welcomes initiatives designed to enhance flight safety, the Federation has serious concerns about the data collection process, data ownership, and the use of these new tools for non-technical purposes. Comparisons between pilots and/or the establishment of a "ranking system" that would evaluate pilots based on fuel use or other cost-saving figures are some examples.

POSITION

IFALPA believes that the following requirements should be met before the deployment of self-assessment software/tools by an airline:

- 1. The airline should have a fully established Flight Data Analysis Programme (FDAP).
- Such software/tools should not be advertised by the airline as a "safety enhancement". Safety is based on standardization and average data, not on individual data sent to individual pilots.
- 3. Data used in the program should be included in the provisions of the FDAP Agreement between the airline and the Pilot Association. The self-assessment tool should permit each individual pilot to delete all self-assessment data presented to that pilot to assess their own performance, once review by that pilot is completed. After a reasonable period for review by the pilot expires, the data that was captured for self-assessment purposes only should be automatically deleted from the FDAP system unless it would have normally been retained within the FDAP for purposes other than pilot self-assessment.
- Data related to a specific flight should only be accessed and dispatched if.

 prior consent of the pilots concerned has been obtained; or
 a specific request of the pilot(s) concerned has been received
- 5. Data should never be used to assess pilot competency or training requirements.
- 6. Data should never be used for disciplinary measures.
- There should be a strict procedure for data collection, validation, ownership, and storage.
- Other than the pilots concerned, access to the data should be restricted to the parties authorized under the provisions of the FDAP.
- Pilots should have received suitable training and/or education material on the use and limitations of the system.



FOUNDERS

FACTORY.

Partner with us to deliver a human solution to an age old problem.







Example Aviation Behaviors Signol Could Change



Fuel Load

Captains can plan and confirm fuel additions to a flight which impacts weight and efficiency.



Reduced Engine Taxi Out

One or two engines shut down can help to reduce noise, emissions, and fuel use taxiing to the runway.



Continuous Ascent

Saving fuel by continually ascending to the optimal altitude.



Efficient Flight

Adjusting mid-flight behaviors to mitigate fuel use.



Continuous Descent

Saving fuel by continually descending to land.



Reduced Engine Taxi In

One or two engines shut down can help to reduce noise, emissions, and fuel use taxiing into the dock.

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Example Shipping Behaviors Signol Could Change



Route optimization

Masters can plan routes that arrive just in time.



Trim & draft optimization

Chief Officer can reduce hull resistance and therefore fuel use.



Speed optimization

Saving fuel by selecting the optimum speed for the vessel.



Port Turnaround time

Master can improve maneuvering performance.



Autopilot improvement

Master can find the correct autopilot parameters

Example Building Management Behaviors Signol Could Change



Store Lighting Efficiency

Motivating more efficient management of lighting, linking people decisions to tech decisions



In-Store Heating and Cooling

Working with store data analytics to nudge managers towards specific goals for heating and refrigeration



Income v Outgoings

Is energy efficiency a substitute or complement to store revenue?



Other Utilities Consumption

Using behavioral feedback to optimize water management performance



Deliveries and Drivers

Motivating managers to engage with telematics data remotely to reduce driver inefficiencies, helping to reduce pollution, whilst increasing profits



Backroom and Warehouse

How can logistical data be harnessed to help better management productivity