



# Spectrum Collaboration Challenge

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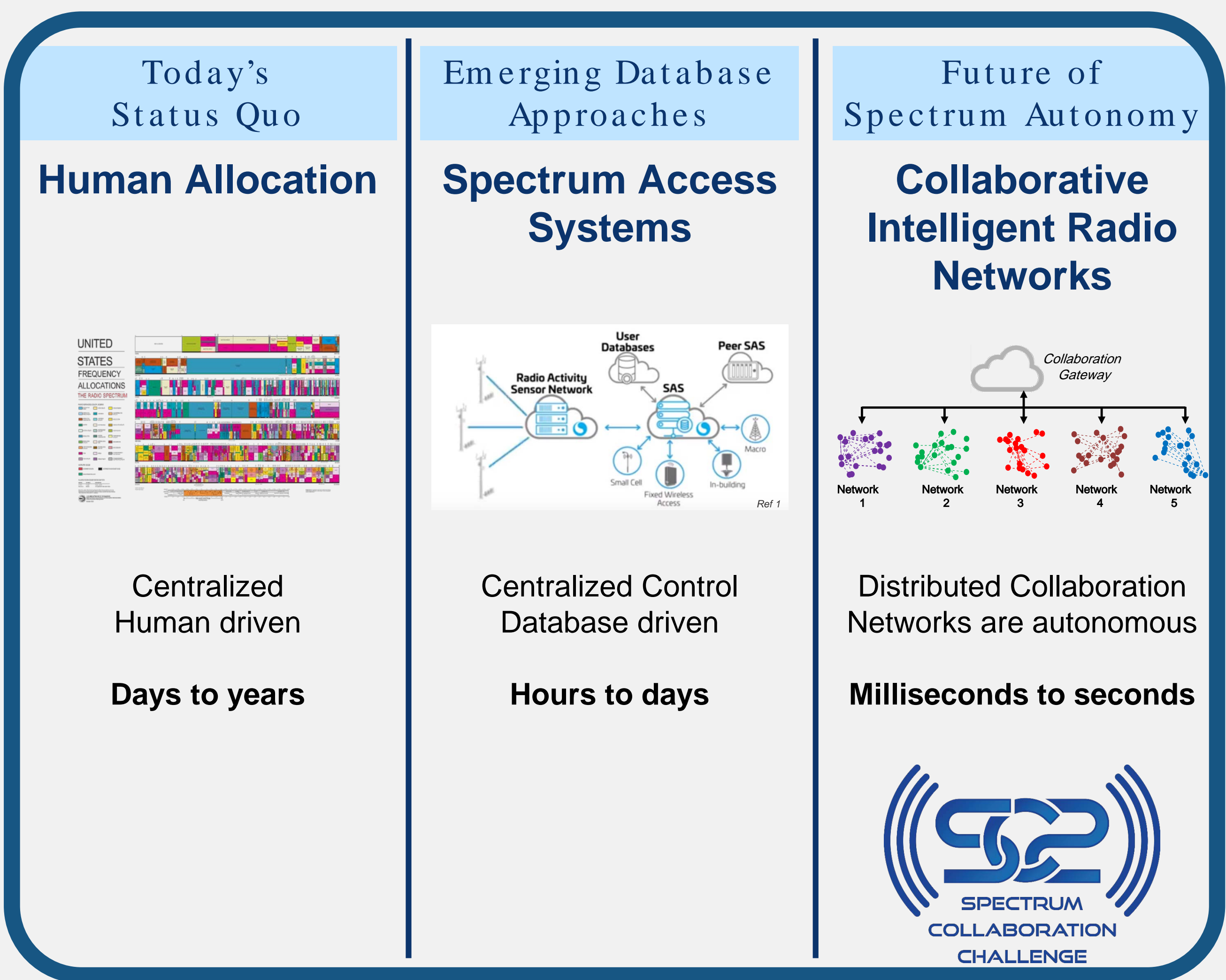


## Specialized Functions



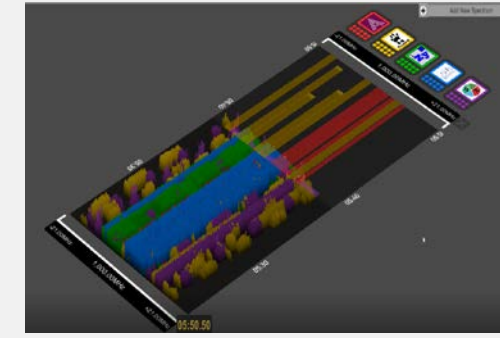
Using AI & Autonomy to unlock the true potential of the RF Spectrum

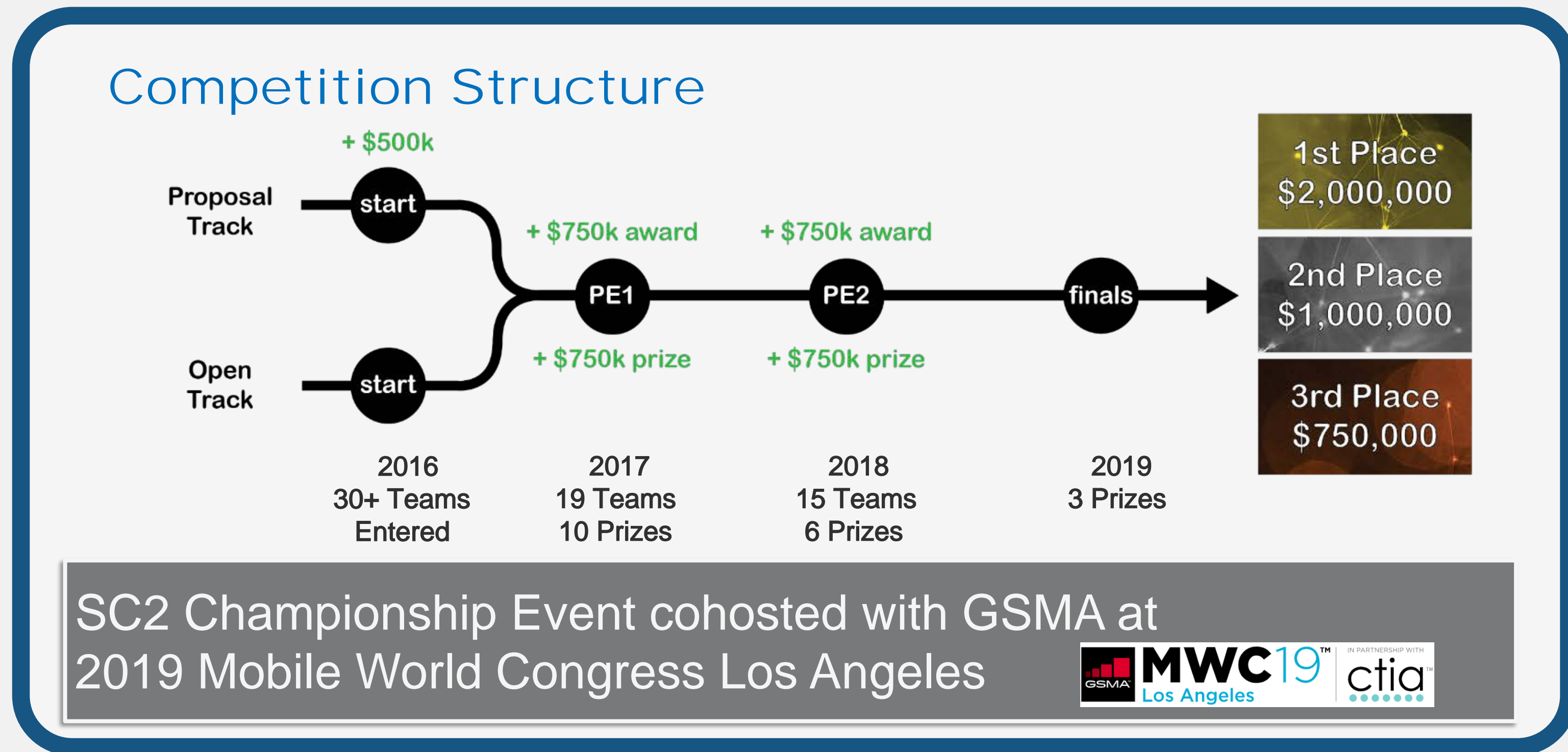
Today, RF Spectrum is managed by dividing it into rigid, exclusively licensed bands. This human-driven process is slow, inflexible, and cannot exploit the full potential capacity of the spectrum.

In SC2, competitors will reimagine a new, fully autonomous wireless paradigm in which radio networks autonomously collaborate to dynamically determine how the spectrum should be used moment to moment. To achieve the goal of true wireless spectrum autonomy SC2 is combining the fields of software defined radio (SDR) and Artificial Intelligence (AI).



Man vs Machine: A state-space explosion

<b>Chess</b>  10 <sup>47</sup> Moves	<b>Go</b>  10 <sup>170</sup> Moves	<b>SC2</b>  10 <sup>3</sup> Moves per radio 100 <sup>103</sup> Moves for all radios <b>200<sup>100103</sup> = ∞ Total Moves</b>
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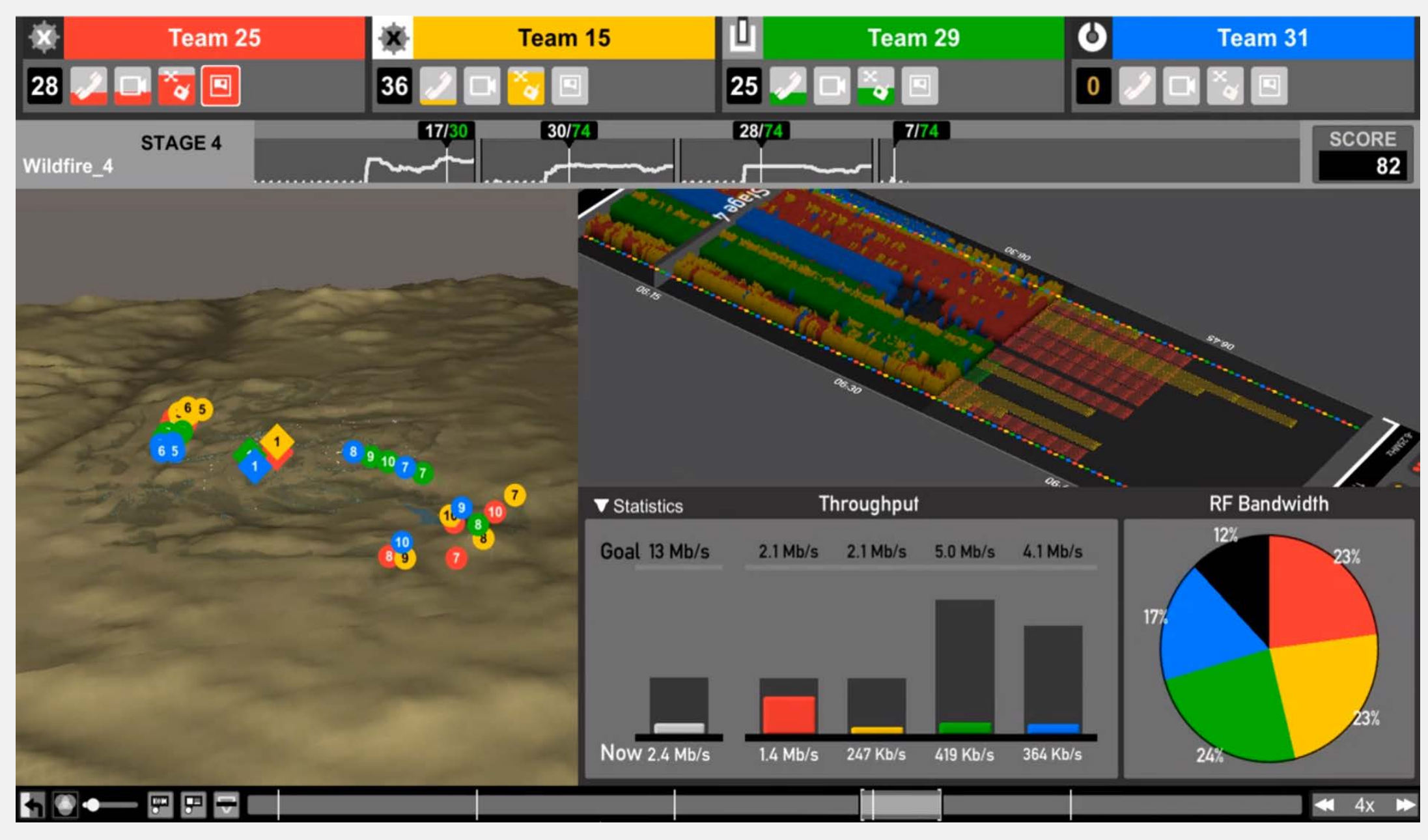


### Game Play:

- 5 teams must move data through a spectrum obstacle course
- The teams themselves are obstacles
- Spectrum obstacles such as incumbents and jammers increase difficulty

### Objectives:

- Ensemble must devise a strategy to meet all required outcomes
- Scoring rewards teams that collaborate to meet ensemble objectives while maximizing their own performance

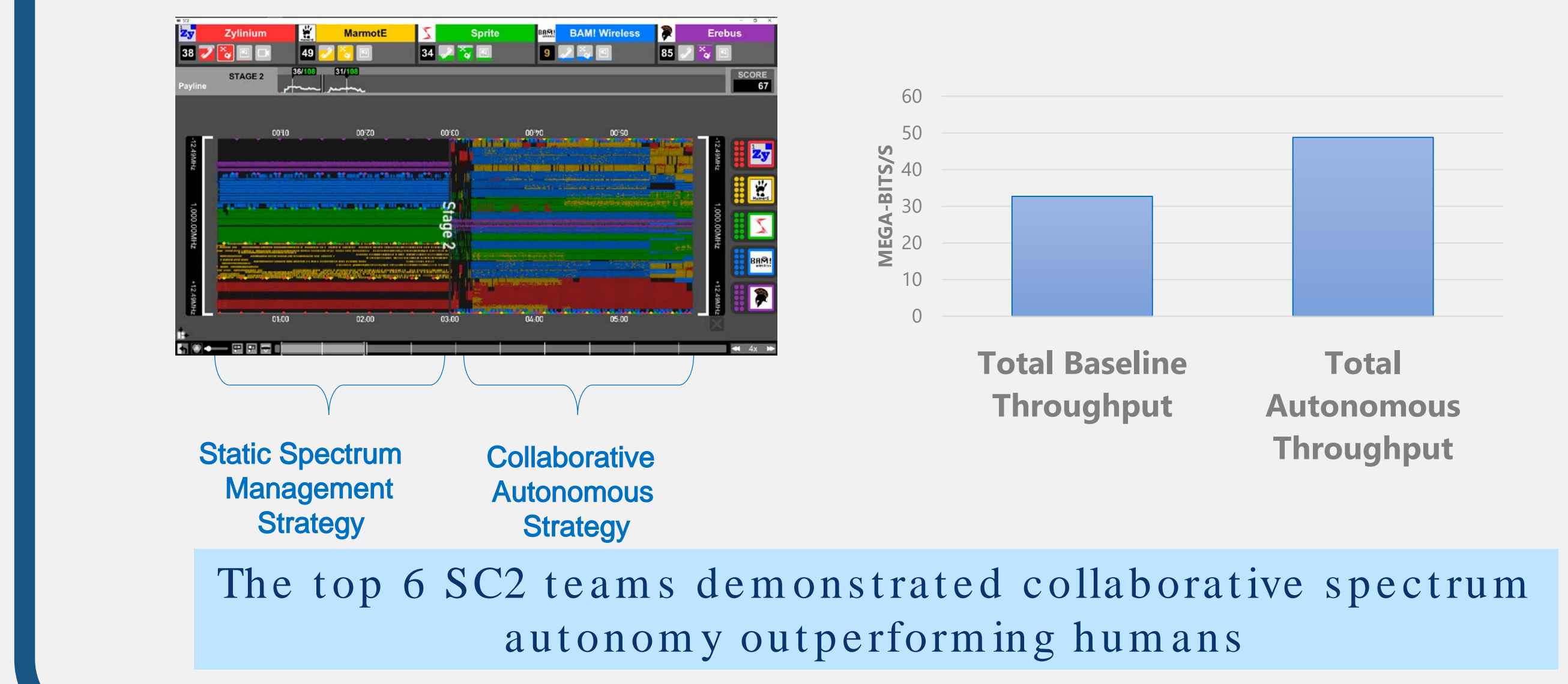


### Required Outcomes

- VOIP links
- UAV surveillance
- Sat. imagery
- GPS Positions
- Helmet Cam Video

### Preliminary Results

At the December 2018 qualifying event, teams had to improve spectrum utility over a human-engineered baseline to earn a \$750K prize



References:  
1. CBRS Alliance  
2. www.chess.com/article/view/how-to-set-up-a-chess-game  
3. medium.com/syncedreview/facebook-open-sources-improved-go-bot-and-huge-game-library-64899fab7d5